

quence listing part.

[42327] VGAM3026 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3026 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3026 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42328] VGAM3026 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3026 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3026 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3026 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3026 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42329] The complementary binding of VGAM3026 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3026 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3026 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3026 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42330] It is appreciated that VGAM3026 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3026 host target genes. The mRNA of each one of this plurality of VGAM3026 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3026 RNA, herein designated VGAM RNA, and which when bound by VGAM3026 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3026 host target proteins.

[42331] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3026 gene, herein designated VGAM GENE, on one or more VGAM3026 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42332] It is yet further appreciated that a function of VGAM3026

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3026 include diagnosis, prevention and treatment of viral infection by Satellite virus of maize white line mosaic virus. Specific functions, and accordingly utilities, of VGAM3026 correlate with, and may be deduced from, the identity of the host target genes which VGAM3026 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42333] Nucleotide sequences of the VGAM3026 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3026 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3026 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3026 are further described hereinbelow with reference to Table 1.

[42334] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3026 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42335] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3027 (VGAM3027) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42336] VGAM3027 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3027 was detected is described hereinabove with reference to Figs. 2–8.

[42337] VGAM3027 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Satellite virus of maize white line mosaic virus. VGAM3027 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42338] VGAM3027 gene, herein designated VGAM GENE, encodes a VGAM3027 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3027 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3027 precursor RNA is designated SEQ ID:69151, and is provided

hereinbelow with reference to the sequence listing part.

[42339] VGAM3027 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3027 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42340] An enzyme complex designated DICER COMPLEX, dices the VGAM3027 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3027 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3027 RNA is designated SEQ ID:69152, and is provided hereinbelow with reference to the sequence listing part.

[42341] VGAM3027 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3027 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3027 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42342] VGAM3027 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3027 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3027 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3027 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3027 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42343] The complementary binding of VGAM3027 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3027 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3027 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3027 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42344] It is appreciated that VGAM3027 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3027 host target genes. The mRNA of each one of this plurality of VGAM3027 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3027 RNA, herein designated VGAM RNA, and which when bound by VGAM3027 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3027 host target proteins.

[42345] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3027 gene, herein designated VGAM GENE, on one or more VGAM3027 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42346] It is yet further appreciated that a function of VGAM3027 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3027 include diagnosis, prevention and treatment of viral infection by Satellite virus of maize white line mosaic virus. Specific functions, and accordingly utilities, of VGAM3027 correlate with, and may be deduced from, the identity of the host target genes which VGAM3027 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42347] Nucleotide sequences of the VGAM3027 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3027 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3027 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3027 are further described hereinbelow with reference to Table 1.

[42348] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3027 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42349] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3028 (VGAM3028) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42350] VGAM3028 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3028 was detected is described hereinabove with reference to Figs. 2–8.

[42351] VGAM3028 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Saimiriine herpesvirus 2. VGAM3028 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42352] VGAM3028 gene, herein designated VGAM GENE, encodes a VGAM3028 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3028 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3028 precursor RNA is designated SEQ ID:69192, and is provided hereinbelow with reference to the sequence listing part.

[42353] VGAM3028 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3028 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42354] An enzyme complex designated DICER COMPLEX, dices the VGAM3028 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3028 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3028 RNA is designated SEQ ID:69193, and is provided hereinbelow with reference to the sequence listing part.

[42355] VGAM3028 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3028 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3028 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42356] VGAM3028 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3028 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3028 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3028 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3028 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42357] The complementary binding of VGAM3028 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3028 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3028 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3028 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42358] It is appreciated that VGAM3028 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3028 host target genes. The mRNA of each one of this plurality of VGAM3028 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3028 RNA, herein designated VGAM

RNA, and which when bound by VGAM3028 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3028 host target proteins.

[42359] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3028 gene, herein designated VGAM GENE, on one or more VGAM3028 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42360] It is yet further appreciated that a function of VGAM3028 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3028 include diagnosis, prevention and treatment of viral infection by Saimiriine herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3028 correlate with, and may be deduced from, the identity of the host target genes which VGAM3028 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42361] Nucleotide sequences of the VGAM3028 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3028 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3028 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3028 are further described hereinbelow with reference to Table 1.

[42362] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3028 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42363] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3029 (VGAM3029) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42364] VGAM3029 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3029 was detected is described hereinabove with reference to Figs. 2–8.

[42365] VGAM3029 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Saimiriine herpesvirus 2. VGAM3029 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42366] VGAM3029 gene, herein designated VGAM GENE, encodes a VGAM3029 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3029 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3029 precursor RNA is designated SEQ ID:69205, and is provided hereinbelow with reference to the sequence listing part.

[42367] VGAM3029 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3029 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42368] An enzyme complex designated DICER COMPLEX, dices the VGAM3029 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3029 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3029 RNA is designated SEQ ID:69206, and is provided hereinbelow with reference to the sequence listing part.

[42369] VGAM3029 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3029 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3029 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42370] VGAM3029 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3029 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3029 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3029 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3029 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42371] The complementary binding of VGAM3029 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3029 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3029 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3029 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42372] It is appreciated that VGAM3029 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3029 host target genes. The mRNA of each one of this plurality of VGAM3029 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3029 RNA, herein designated VGAM RNA, and which when bound by VGAM3029 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3029 host target proteins.

[42373] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3029 gene, herein designated VGAM GENE, on one or more VGAM3029 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42374] It is yet further appreciated that a function of VGAM3029 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3029 include diagnosis, prevention and

treatment of viral infection by Saimiriine herpesvirus 2.

Specific functions, and accordingly utilities, of VGAM3029 correlate with, and may be deduced from, the identity of the host target genes which VGAM3029 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42375] Nucleotide sequences of the VGAM3029 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3029 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3029 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3029 are further described hereinbelow with reference to Table 1.

[42376] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3029 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42377] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3030 (VGAM3030) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42378] VGAM3030 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3030 was detected is described hereinabove with reference to Figs. 2–8.

[42379] VGAM3030 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Saimiriine herpesvirus 2. VGAM3030 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42380] VGAM3030 gene, herein designated VGAM GENE, encodes a VGAM3030 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3030 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3030 precursor RNA is designated SEQ ID:69213, and is provided hereinbelow with reference to the sequence listing part.

[42381] VGAM3030 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3030 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42382] An enzyme complex designated DICER COMPLEX, dices the VGAM3030 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3030 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3030 RNA is designated SEQ ID:69214, and is provided hereinbelow with reference to the sequence listing part.

[42383] VGAM3030 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3030 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3030 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42384] VGAM3030 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3030 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3030 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3030 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3030 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42385] The complementary binding of VGAM3030 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3030 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3030 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3030 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42386] It is appreciated that VGAM3030 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3030 host target genes. The mRNA of each one of this plurality of VGAM3030 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3030 RNA, herein designated VGAM RNA, and which when bound by VGAM3030 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3030 host target proteins.

[42387] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3030 gene, herein designated VGAM GENE, on one or more VGAM3030 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42388] It is yet further appreciated that a function of VGAM3030 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3030 include diagnosis, prevention and treatment of viral infection by Saimiriine herpesvirus 2.

Specific functions, and accordingly utilities, of VGAM3030 correlate with, and may be deduced from, the identity of the host target genes which VGAM3030 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42389] Nucleotide sequences of the VGAM3030 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3030 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3030 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3030 are further described hereinbelow with reference to Table 1.

[42390] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3030 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42391] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3031 (VGAM3031) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[42392] VGAM3031 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3031 was detected is described hereinabove with reference to Figs. 2–8.

[42393] VGAM3031 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3031 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42394] VGAM3031 gene, herein designated VGAM GENE, encodes a VGAM3031 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3031 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3031 precursor RNA is designated SEQ ID:69218, and is provided hereinbelow with reference to the sequence listing part.

[42395] VGAM3031 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3031 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42396] An enzyme complex designated DICER COMPLEX, dices the VGAM3031 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3031 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3031 RNA is designated SEQ ID:69219, and is provided hereinbelow with reference to the sequence listing part.

[42397] VGAM3031 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3031 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3031 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42398] VGAM3031 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3031 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3031 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3031 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3031 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42399] The complementary binding of VGAM3031 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3031 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3031 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3031 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42400] It is appreciated that VGAM3031 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3031 host target genes. The mRNA of each one of this plurality of VGAM3031 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3031 RNA, herein designated VGAM RNA, and which when bound by VGAM3031 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3031 host target proteins.

[42401] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3031 gene, herein designated VGAM GENE, on one or more VGAM3031 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42402] It is yet further appreciated that a function of VGAM3031 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3031 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of

VGAM3031 correlate with, and may be deduced from, the identity of the host target genes which VGAM3031 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42403] Nucleotide sequences of the VGAM3031 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3031 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3031 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3031 are further described hereinbelow with reference to Table 1.

[42404] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3031 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42405] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3032 (VGAM3032) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[42406] VGAM3032 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3032 was detected is described hereinabove with reference to Figs. 2–8.

[42407] VGAM3032 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3032 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42408] VGAM3032 gene, herein designated VGAM GENE, encodes a VGAM3032 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3032 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3032 precursor RNA is designated SEQ ID:69226, and is provided hereinbelow with reference to the sequence listing part.

[42409] VGAM3032 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3032 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42410] An enzyme complex designated DICER COMPLEX, dices the VGAM3032 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3032 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3032 RNA is designated SEQ ID:69227, and is provided hereinbelow with reference to the sequence listing part.

[42411] VGAM3032 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3032 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3032 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42412] VGAM3032 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3032 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3032 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3032 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3032 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42413] The complementary binding of VGAM3032 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3032 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3032 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3032 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42414] It is appreciated that VGAM3032 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3032 host target genes. The mRNA of each one of this plurality of VGAM3032 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3032 RNA, herein designated VGAM RNA, and which when bound by VGAM3032 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3032 host target proteins.

[42415] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3032 gene, herein designated VGAM GENE, on one or more VGAM3032 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42416] It is yet further appreciated that a function of VGAM3032 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3032 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3032 correlate with, and may be deduced from, the

identity of the host target genes which VGAM3032 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42417] Nucleotide sequences of the VGAM3032 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3032 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3032 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3032 are further described hereinbelow with reference to Table 1.

[42418] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3032 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42419] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3033 (VGAM3033) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42420] VGAM3033 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3033 was detected is described hereinabove with reference to Figs. 2–8.

[42421] VGAM3033 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus. VGAM3033 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42422] VGAM3033 gene, herein designated VGAM GENE, encodes a VGAM3033 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3033 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3033 precursor RNA is designated SEQ ID:69231, and is provided hereinbelow with reference to the sequence listing part.

[42423] VGAM3033 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3033 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42424] An enzyme complex designated DICER COMPLEX, dices the VGAM3033 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3033 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3033 RNA is designated SEQ ID:69232, and is provided hereinbelow with reference to the sequence listing part.

[42425] VGAM3033 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3033 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3033 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42426] VGAM3033 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3033 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3033 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3033 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3033 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42427] The complementary binding of VGAM3033 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3033 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3033 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3033 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42428] It is appreciated that VGAM3033 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3033 host target genes. The mRNA of each one of this plurality of VGAM3033 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3033 RNA, herein designated VGAM RNA, and which when bound by VGAM3033 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3033 host target proteins.

[42429] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3033 gene, herein designated VGAM GENE, on one or more VGAM3033 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42430] It is yet further appreciated that a function of VGAM3033 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3033 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3033 correlate with, and may be deduced from, the identity of the host target genes which VGAM3033 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[42431] Nucleotide sequences of the VGAM3033 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3033 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3033 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3033 are further described hereinbelow with reference to Table 1.

[42432] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3033 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42433] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3034 (VGAM3034) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42434] VGAM3034 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3034 was detected is described hereinabove with reference to Figs. 2–8.

[42435] VGAM3034 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human erythrovirus V9. VGAM3034 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42436] VGAM3034 gene, herein designated VGAM GENE, encodes a VGAM3034 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3034 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3034 precursor RNA is designated SEQ ID:69244, and is provided hereinbelow with reference to the sequence listing part.

[42437] VGAM3034 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3034 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42438] An enzyme complex designated DICER COMPLEX, dices the VGAM3034 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3034 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3034 RNA is designated SEQ ID:69245, and is provided hereinbelow with reference to the sequence listing part.

[42439] VGAM3034 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3034 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3034 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42440] VGAM3034 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3034 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3034 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3034 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3034 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[42441] The complementary binding of VGAM3034 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3034 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3034 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3034 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42442] It is appreciated that VGAM3034 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3034 host target genes. The mRNA of each one of this plurality of VGAM3034 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3034 RNA, herein designated VGAM RNA, and which when bound by VGAM3034 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3034 host target proteins.

[42443] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3034 gene, herein designated VGAM GENE, on one or more VGAM3034 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42444] It is yet further appreciated that a function of VGAM3034 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3034 include diagnosis, prevention and treatment of viral infection by Human erythrovirus V9. Specific functions, and accordingly utilities, of VGAM3034 correlate with, and may be deduced from, the identity of the host target genes which VGAM3034 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[42445] Nucleotide sequences of the VGAM3034 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3034 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3034 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3034 are further described hereinbelow with reference to Table 1.

[42446] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3034 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42447] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3035 (VGAM3035) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42448] VGAM3035 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3035 was detected is described hereinabove with reference to Figs. 2–8.

[42449] VGAM3035 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bombyx mori densovirus 1. VGAM3035 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42450] VGAM3035 gene, herein designated VGAM GENE, encodes a VGAM3035 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3035 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3035 precursor RNA is designated SEQ ID:69256, and is provided hereinbelow with reference to the sequence listing part.

[42451] VGAM3035 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3035 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42452] An enzyme complex designated DICER COMPLEX, dices the VGAM3035 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3035 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3035 RNA is designated SEQ ID:69257, and is provided hereinbelow with reference to the sequence listing part.

[42453] VGAM3035 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3035 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3035 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[42454] VGAM3035 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3035 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3035 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3035 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3035 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42455] The complementary binding of VGAM3035 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3035 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3035 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3035 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42456] It is appreciated that VGAM3035 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3035 host target genes. The mRNA of each one of this plurality of VGAM3035 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3035 RNA, herein designated VGAM RNA, and which when bound by VGAM3035 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3035 host target proteins.

[42457] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3035 gene, herein designated VGAM GENE, on one

or more VGAM3035 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42458] It is yet further appreciated that a function of VGAM3035 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3035 include diagnosis, prevention and treatment of viral infection by Bombyx mori densovirus 1. Specific functions, and accordingly utilities, of VGAM3035 correlate with, and may be deduced from, the identity of the host target genes which VGAM3035 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42459] Nucleotide sequences of the VGAM3035 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3035 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3035 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3035 are further described hereinbelow with reference to Table 1.

[42460] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3035 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42461] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3036 (VGAM3036) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42462] VGAM3036 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3036 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[42463] VGAM3036 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3036 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42464] VGAM3036 gene, herein designated VGAM GENE, encodes a VGAM3036 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3036 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3036 precursor RNA is designated SEQ ID:69271, and is provided hereinbelow with reference to the sequence listing part.

[42465] VGAM3036 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3036 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42466] An enzyme complex designated DICER COMPLEX, dices the VGAM3036 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3036 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3036 RNA is designated SEQ ID:69272, and is provided hereinbelow with reference to the sequence listing part.

[42467] VGAM3036 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3036 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3036 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42468] VGAM3036 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3036 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3036 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3036 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3036 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42469] The complementary binding of VGAM3036 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3036 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3036 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3036 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42470] It is appreciated that VGAM3036 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3036 host target genes. The mRNA of each one of this plurality of VGAM3036 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3036 RNA, herein designated VGAM RNA, and which when bound by VGAM3036 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3036 host target proteins.

[42471] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3036 gene, herein designated VGAM GENE, on one or more VGAM3036 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42472] It is yet further appreciated that a function of VGAM3036 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3036 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3036 correlate with, and may be deduced from, the identity of the host target genes which VGAM3036 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42473] Nucleotide sequences of the VGAM3036 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3036 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3036 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3036 are further described hereinbelow with reference to Table 1.

[42474] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3036 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42475] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3037 (VGAM3037) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42476] VGAM3037 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3037 was detected is described hereinabove with reference to Figs. 2-8.

[42477] VGAM3037 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3037 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42478] VGAM3037 gene, herein designated VGAM GENE, encodes a VGAM3037 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3037 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3037 precursor RNA is designated SEQ ID:69277, and is provided hereinbelow with reference to the sequence listing part.

[42479] VGAM3037 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3037 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[42480] An enzyme complex designated DICER COMPLEX, dices the VGAM3037 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3037 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3037 RNA is designated SEQ ID:69278, and is provided hereinbelow with reference to the sequence listing part.

[42481] VGAM3037 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3037 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3037 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42482] VGAM3037 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3037 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3037 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3037 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3037 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42483] The complementary binding of VGAM3037 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3037 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3037 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3037 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42484] It is appreciated that VGAM3037 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3037 host target genes. The mRNA of each one of this plurality of VGAM3037 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3037 RNA, herein designated VGAM RNA, and which when bound by VGAM3037 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3037 host target proteins.

[42485] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3037 gene, herein designated VGAM GENE, on one or more VGAM3037 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42486] It is yet further appreciated that a function of VGAM3037 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3037 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3037 correlate with, and may be deduced from, the identity of the host target genes which VGAM3037 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42487] Nucleotide sequences of the VGAM3037 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3037 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3037 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3037 are further described hereinbelow with reference to Table 1.

[42488] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3037 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42489] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3038 (VGAM3038) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42490] VGAM3038 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3038 was detected is described hereinabove with reference to Figs. 2-8.

[42491] VGAM3038 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Cowpox virus.

VGAM3038 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42492] VGAM3038 gene, herein designated VGAM GENE, encodes a VGAM3038 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3038 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3038 precursor RNA is designated SEQ ID:69291, and is provided hereinbelow with reference to the sequence listing part.

[42493] VGAM3038 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3038 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42494] An enzyme complex designated DICER COMPLEX, dices the VGAM3038 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3038 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3038 RNA is designated SEQ ID:69292, and is provided hereinbelow with reference to the sequence listing part.

[42495] VGAM3038 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3038 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3038 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42496] VGAM3038 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3038 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3038 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3038 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3038 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42497] The complementary binding of VGAM3038 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3038 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3038 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3038 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42498] It is appreciated that VGAM3038 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3038 host target genes. The mRNA of each one of this plurality of VGAM3038 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3038 RNA, herein designated VGAM RNA, and which when bound by VGAM3038 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3038 host target proteins.

[42499] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3038 gene, herein designated VGAM GENE, on one or more VGAM3038 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42500] It is yet further appreciated that a function of VGAM3038 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3038 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3038 correlate with, and may be deduced from, the identity of the host target genes which VGAM3038 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42501] Nucleotide sequences of the VGAM3038 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3038 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3038 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3038 are further described hereinbelow with reference to Table 1.

[42502] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3038 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42503] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3039 (VGAM3039) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42504] VGAM3039 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3039 was detected is described hereinabove with reference to Figs. 2-8.

[42505] VGAM3039 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 7.

VGAM3039 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42506] VGAM3039 gene, herein designated VGAM GENE, encodes a VGAM3039 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3039 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3039 precursor RNA is designated SEQ ID:69324, and is provided hereinbelow with reference to the sequence listing part.

[42507] VGAM3039 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3039 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42508] An enzyme complex designated DICER COMPLEX, dices

the VGAM3039 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3039 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3039 RNA is designated SEQ ID:69325, and is provided hereinbelow with reference to the sequence listing part.

[42509] VGAM3039 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3039 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3039 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42510] VGAM3039 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3039 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3039 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3039 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3039 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42511] The complementary binding of VGAM3039 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3039 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3039 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3039 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42512] It is appreciated that VGAM3039 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3039 host target genes. The mRNA of each one of this plurality of VGAM3039 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3039 RNA, herein designated VGAM RNA, and which when bound by VGAM3039 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3039 host target proteins.

[42513] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3039 gene, herein designated VGAM GENE, on one or more VGAM3039 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42514] It is yet further appreciated that a function of VGAM3039 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3039 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3039 correlate with, and may be deduced from, the identity of the host target genes which VGAM3039 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42515] Nucleotide sequences of the VGAM3039 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3039 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3039 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3039 are further described hereinbelow with reference to Table 1.

[42516] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3039 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42517] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3040 (VGAM3040) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42518] VGAM3040 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3040 was detected is described hereinabove with reference to Figs. 2-8.

[42519] VGAM3040 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3040 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42520] VGAM3040 gene, herein designated VGAM GENE, encodes a VGAM3040 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3040 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3040 precursor RNA is designated SEQ ID:69329, and is provided hereinbelow with reference to the sequence listing part.

[42521] VGAM3040 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3040 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42522] An enzyme complex designated DICER COMPLEX, dices the VGAM3040 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3040 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3040 RNA is designated SEQ ID:69330, and is provided hereinbelow with reference to the sequence listing part.

[42523] VGAM3040 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3040 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3040 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42524] VGAM3040 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3040 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3040 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3040 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3040 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42525] The complementary binding of VGAM3040 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3040 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3040

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3040 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42526] It is appreciated that VGAM3040 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3040 host target genes. The mRNA of each one of this plurality of VGAM3040 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3040 RNA, herein designated VGAM RNA, and which when bound by VGAM3040 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3040 host target proteins.

[42527] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3040 gene, herein designated VGAM GENE, on one or more VGAM3040 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42528] It is yet further appreciated that a function of VGAM3040 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3040 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3040 correlate with, and may be deduced from, the identity of the host target genes which VGAM3040 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42529] Nucleotide sequences of the VGAM3040 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3040 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3040 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3040 are further described hereinbelow with reference to Table 1.

[42530] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3040 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42531] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3041 (VGAM3041) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42532] VGAM3041 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3041 was detected is described hereinabove with reference to Figs. 2-8.

[42533] VGAM3041 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine papillomavirus type 2. VGAM3041 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[42534] VGAM3041 gene, herein designated VGAM GENE, encodes a VGAM3041 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3041 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3041 precursor RNA is designated SEQ ID:69334, and is provided hereinbelow with reference to the sequence listing part.

[42535] VGAM3041 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3041 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42536] An enzyme complex designated DICER COMPLEX, dices the VGAM3041 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3041 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3041 RNA is designated SEQ ID:69335, and is provided hereinbelow with reference to the sequence listing part.

[42537] VGAM3041 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3041 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3041 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42538] VGAM3041 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3041 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3041 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3041 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3041 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42539] The complementary binding of VGAM3041 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3041 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3041 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3041 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42540] It is appreciated that VGAM3041 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3041 host target genes. The mRNA of each one of this plurality of VGAM3041 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3041 RNA, herein designated VGAM RNA, and which when bound by VGAM3041 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3041 host target proteins.

[42541] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3041 gene, herein designated VGAM GENE, on one or more VGAM3041 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42542] It is yet further appreciated that a function of VGAM3041 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3041 include diagnosis, prevention and treatment of viral infection by Bovine papillomavirus type 2. Specific functions, and accordingly utilities, of VGAM3041 correlate with, and may be deduced from, the identity of the host target genes which VGAM3041 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42543] Nucleotide sequences of the VGAM3041 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3041 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3041 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3041 are further

described hereinbelow with reference to Table 1.

[42544] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3041 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42545] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3042 (VGAM3042) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42546] VGAM3042 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3042 was detected is described hereinabove with reference to Figs. 2-8.

[42547] VGAM3042 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bombyx mori densovirus 5. VGAM3042 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42548] VGAM3042 gene, herein designated VGAM GENE, encodes a VGAM3042 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3042 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3042 precursor RNA is designated SEQ ID:69361, and is provided hereinbelow with reference to the sequence listing part.

[42549] VGAM3042 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3042 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42550] An enzyme complex designated DICER COMPLEX, dices the VGAM3042 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3042 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3042 RNA is designated SEQ ID:69362, and is provided hereinbelow with reference to the sequence listing part.

[42551] VGAM3042 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3042 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3042 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42552] VGAM3042 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3042 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3042 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3042 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3042 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42553] The complementary binding of VGAM3042 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3042 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3042 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3042 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42554] It is appreciated that VGAM3042 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3042 host target genes. The mRNA of each one of this plurality of VGAM3042 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3042 RNA, herein designated VGAM RNA, and which when bound by VGAM3042 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3042 host target proteins.

[42555] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3042 gene, herein designated VGAM GENE, on one or more VGAM3042 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42556] It is yet further appreciated that a function of VGAM3042 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3042 include diagnosis, prevention and treatment of viral infection by Bombyx mori densovirus 5. Specific functions, and accordingly utilities, of VGAM3042 correlate with, and may be deduced from, the identity of the host target genes which VGAM3042 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42557] Nucleotide sequences of the VGAM3042 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3042 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3042 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3042 are further described hereinbelow with reference to Table 1.

[42558] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3042 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42559] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3043 (VGAM3043) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42560] VGAM3043 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3043 was detected is described hereinabove with reference to Figs. 2-8.

[42561] VGAM3043 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human immunodeficiency virus 1. VGAM3043 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42562] VGAM3043 gene, herein designated VGAM GENE, encodes

a VGAM3043 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3043 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3043 precursor RNA is designated SEQ ID:69366, and is provided hereinbelow with reference to the sequence listing part.

[42563] VGAM3043 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3043 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42564] An enzyme complex designated DICER COMPLEX, dices the VGAM3043 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3043 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3043 RNA is designated SEQ ID:69367, and is provided hereinbelow with reference to the sequence listing part.

[42565] VGAM3043 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3043 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3043 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42566] VGAM3043 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3043 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3043 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3043 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3043 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42567] The complementary binding of VGAM3043 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3043 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3043 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3043 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[42568] It is appreciated that VGAM3043 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3043 host target genes. The mRNA of each one of this plurality of VGAM3043 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3043 RNA, herein designated VGAM RNA, and which when bound by VGAM3043 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3043 host target proteins.

[42569] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3043 gene, herein designated VGAM GENE, on one or more VGAM3043 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42570] It is yet further appreciated that a function of VGAM3043 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3043 include diagnosis, prevention and treatment of viral infection by Human immunodeficiency virus 1. Specific functions, and accordingly utilities, of VGAM3043 correlate with, and may be deduced from, the identity of the host target genes which VGAM3043 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42571] Nucleotide sequences of the VGAM3043 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3043 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3043 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3043 are further described hereinbelow with reference to Table 1.

[42572] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3043 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42573] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3044 (VGAM3044) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42574] VGAM3044 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3044 was detected is described hereinabove with reference to Figs. 2-8.

[42575] VGAM3044 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rhesus monkey papillomavirus. VGAM3044 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42576] VGAM3044 gene, herein designated VGAM GENE, encodes a VGAM3044 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3044 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3044 precursor RNA is designated SEQ ID:69388, and is provided hereinbelow with reference to the sequence listing part.

[42577] VGAM3044 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3044 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42578] An enzyme complex designated DICER COMPLEX, dices the VGAM3044 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3044 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3044 RNA is designated SEQ ID:69389, and is provided hereinbelow with reference to the sequence listing part.

[42579] VGAM3044 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3044 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3044 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42580] VGAM3044 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3044 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3044 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3044 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3044 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42581] The complementary binding of VGAM3044 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3044 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3044 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3044 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42582] It is appreciated that VGAM3044 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3044 host target genes. The mRNA of each one of this plurality of VGAM3044 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3044 RNA, herein designated VGAM RNA, and which when bound by VGAM3044 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3044 host target proteins.

[42583] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3044 gene, herein designated VGAM GENE, on one or more VGAM3044 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42584] It is yet further appreciated that a function of VGAM3044 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3044 include diagnosis, prevention and treatment of viral infection by Rhesus monkey papillomavirus. Specific functions, and accordingly utilities, of VGAM3044 correlate with, and may be deduced from, the identity of the host target genes which VGAM3044 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42585] Nucleotide sequences of the VGAM3044 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3044 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3044 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3044 are further described hereinbelow with reference to Table 1.

[42586] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3044 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42587] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3045 (VGAM3045) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42588] VGAM3045 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3045 was detected is described hereinabove with reference to Figs. 2-8.

[42589] VGAM3045 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bombyx mori densovirus 1. VGAM3045 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42590] VGAM3045 gene, herein designated VGAM GENE, encodes a VGAM3045 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3045 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3045 precursor RNA is designated SEQ ID:69407, and is provided hereinbelow with reference to the sequence listing part.

[42591] VGAM3045 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3045 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42592] An enzyme complex designated DICER COMPLEX, dices the VGAM3045 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3045 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3045 RNA is designated SEQ ID:69408, and is provided hereinbelow with reference to the sequence listing part.

[42593] VGAM3045 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3045 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3045 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42594] VGAM3045 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3045 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3045 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3045 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3045 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42595] The complementary binding of VGAM3045 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3045 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3045 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3045 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42596] It is appreciated that VGAM3045 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3045 host target genes. The mRNA of each one of this plurality of VGAM3045 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3045 RNA, herein designated VGAM RNA, and which when bound by VGAM3045 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3045 host target proteins.

[42597] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3045 gene, herein designated VGAM GENE, on one or more VGAM3045 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42598] It is yet further appreciated that a function of VGAM3045 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3045 include diagnosis, prevention and treatment of viral infection by Bombyx mori densovirus 1. Specific functions, and accordingly utilities, of VGAM3045 correlate with, and may be deduced from, the identity of the host target genes which VGAM3045 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42599] Nucleotide sequences of the VGAM3045 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3045 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3045 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3045 are further described hereinbelow with reference to Table 1.

[42600] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3045 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42601] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3046 (VGAM3046) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42602] VGAM3046 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3046 was detected is described hereinabove with reference to Figs. 2–8.

[42603] VGAM3046 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3046 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42604] VGAM3046 gene, herein designated VGAM GENE, encodes a VGAM3046 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3046 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3046 precursor RNA is designated SEQ ID:69412, and is provided hereinbelow with reference to the sequence listing part.

[42605] VGAM3046 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3046 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42606] An enzyme complex designated DICER COMPLEX, dices the VGAM3046 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3046 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3046 RNA is designated SEQ ID:69413, and is provided hereinbelow with reference to the sequence listing part.

[42607] VGAM3046 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3046 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3046 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42608] VGAM3046 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3046 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3046 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3046 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3046 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42609] The complementary binding of VGAM3046 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3046 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3046 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3046 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42610] It is appreciated that VGAM3046 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3046 host target genes. The mRNA of each one of this plurality of VGAM3046 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3046 RNA, herein designated VGAM RNA, and which when bound by VGAM3046 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3046 host target proteins.

[42611] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3046 gene, herein designated VGAM GENE, on one or more VGAM3046 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [42612] It is yet further appreciated that a function of VGAM3046 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3046 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3046 correlate with, and may be deduced from, the identity of the host target genes which VGAM3046 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [42613] Nucleotide sequences of the VGAM3046 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3046 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3046 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3046 are further described hereinbelow with reference to Table 1.
- [42614] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3046 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42615] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3047 (VGAM3047) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42616] VGAM3047 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3047 was detected is described hereinabove with reference to Figs. 2-8.

[42617] VGAM3047 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Horseradish curly top virus. VGAM3047 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42618] VGAM3047 gene, herein designated VGAM GENE, encodes a VGAM3047 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3047 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3047 precursor RNA is designated SEQ ID:69438, and is provided hereinbelow with reference to the sequence listing part.

[42619] VGAM3047 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3047 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42620] An enzyme complex designated DICER COMPLEX, dices the VGAM3047 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3047 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3047 RNA is designated SEQ ID:69439, and is provided hereinbelow with reference to the sequence listing part.

[42621] VGAM3047 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3047 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3047 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42622] VGAM3047 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3047 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3047 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3047 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3047 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42623] The complementary binding of VGAM3047 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3047 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3047 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3047 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42624] It is appreciated that VGAM3047 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3047 host target genes. The mRNA of

each one of this plurality of VGAM3047 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3047 RNA, herein designated VGAM RNA, and which when bound by VGAM3047 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3047 host target proteins.

[42625] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3047 gene, herein designated VGAM GENE, on one or more VGAM3047 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[42626] It is yet further appreciated that a function of VGAM3047 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3047 include diagnosis, prevention and treatment of viral infection by Horseradish curly top virus. Specific functions, and accordingly utilities, of VGAM3047 correlate with, and may be deduced from, the identity of the host target genes which VGAM3047 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42627] Nucleotide sequences of the VGAM3047 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3047 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3047 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3047 are further described hereinbelow with reference to Table 1.

[42628] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3047 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[42629] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3048 (VGAM3048) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42630] VGAM3048 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3048 was detected is described hereinabove with reference to Figs. 2–8.

[42631] VGAM3048 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3048 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42632] VGAM3048 gene, herein designated VGAM GENE, encodes a VGAM3048 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3048 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3048 precursor RNA is designated SEQ ID:69455, and is provided hereinbelow with reference to the sequence listing part.

[42633] VGAM3048 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3048 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42634] An enzyme complex designated DICER COMPLEX, dices the VGAM3048 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3048 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3048 RNA is designated SEQ ID:69456,

and is provided hereinbelow with reference to the sequence listing part.

[42635] VGAM3048 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3048 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3048 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42636] VGAM3048 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3048 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3048 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3048 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3048 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42637] The complementary binding of VGAM3048 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3048 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3048 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3048 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42638] It is appreciated that VGAM3048 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3048 host target genes. The mRNA of each one of this plurality of VGAM3048 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3048 RNA, herein designated VGAM RNA, and which when bound by VGAM3048 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3048 host target proteins.

[42639] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3048 gene, herein designated VGAM GENE, on one or more VGAM3048 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42640] It is yet further appreciated that a function of VGAM3048 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3048 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3048 correlate with, and may be deduced from, the identity of the host target genes which VGAM3048 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42641] Nucleotide sequences of the VGAM3048 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3048 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3048 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3048 are further described hereinbelow with reference to Table 1.

[42642] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3048 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42643] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3049 (VGAM3049) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42644] VGAM3049 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3049 was detected is described hereinabove with reference to Figs. 2–8.

[42645] VGAM3049 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 2. VGAM3049 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42646] VGAM3049 gene, herein designated VGAM GENE, encodes a VGAM3049 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3049 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3049 precu-

sor RNA is designated SEQ ID:69460, and is provided hereinbelow with reference to the sequence listing part.

[42647] VGAM3049 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3049 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42648] An enzyme complex designated DICER COMPLEX, dices the VGAM3049 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3049 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3049 RNA is designated SEQ ID:69461, and is provided hereinbelow with reference to the se-

quence listing part.

[42649] VGAM3049 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3049 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3049 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42650] VGAM3049 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3049 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3049 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3049 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3049 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42651] The complementary binding of VGAM3049 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3049 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3049 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3049 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42652] It is appreciated that VGAM3049 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3049 host target genes. The mRNA of each one of this plurality of VGAM3049 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3049 RNA, herein designated VGAM RNA, and which when bound by VGAM3049 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3049 host target proteins.

[42653] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3049 gene, herein designated VGAM GENE, on one or more VGAM3049 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42654] It is yet further appreciated that a function of VGAM3049

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3049 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3049 correlate with, and may be deduced from, the identity of the host target genes which VGAM3049 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42655] Nucleotide sequences of the VGAM3049 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3049 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3049 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3049 are further described hereinbelow with reference to Table 1.

[42656] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3049 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42657] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3050 (VGAM3050) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42658] VGAM3050 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3050 was detected is described hereinabove with reference to Figs. 2–8.

[42659] VGAM3050 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 1. VGAM3050 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42660] VGAM3050 gene, herein designated VGAM GENE, encodes a VGAM3050 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3050 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3050 precursor RNA is designated SEQ ID:69507, and is provided

hereinbelow with reference to the sequence listing part.

[42661] VGAM3050 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3050 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42662] An enzyme complex designated DICER COMPLEX, dices the VGAM3050 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3050 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3050 RNA is designated SEQ ID:69508, and is provided hereinbelow with reference to the sequence listing part.

[42663] VGAM3050 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3050 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3050 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42664] VGAM3050 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3050 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3050 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3050 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3050 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42665] The complementary binding of VGAM3050 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3050 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3050 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3050 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42666] It is appreciated that VGAM3050 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3050 host target genes. The mRNA of each one of this plurality of VGAM3050 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3050 RNA, herein designated VGAM RNA, and which when bound by VGAM3050 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3050 host target proteins.

[42667] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3050 gene, herein designated VGAM GENE, on one or more VGAM3050 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42668] It is yet further appreciated that a function of VGAM3050 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3050 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3050 correlate with, and may be deduced from, the identity of the host target genes which VGAM3050 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42669] Nucleotide sequences of the VGAM3050 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3050 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3050 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3050 are further described hereinbelow with reference to Table 1.

[42670] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3050 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42671] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3051 (VGAM3051) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42672] VGAM3051 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3051 was detected is described hereinabove with reference to Figs. 2–8.

[42673] VGAM3051 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3051 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42674] VGAM3051 gene, herein designated VGAM GENE, encodes a VGAM3051 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3051 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3051 precursor RNA is designated SEQ ID:69513, and is provided hereinbelow with reference to the sequence listing part.

[42675] VGAM3051 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3051 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42676] An enzyme complex designated DICER COMPLEX, dices the VGAM3051 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3051 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3051 RNA is designated SEQ ID:69514, and is provided hereinbelow with reference to the sequence listing part.

[42677] VGAM3051 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3051 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3051 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42678] VGAM3051 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3051 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3051 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3051 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3051 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42679] The complementary binding of VGAM3051 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3051 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3051 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3051 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42680] It is appreciated that VGAM3051 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3051 host target genes. The mRNA of each one of this plurality of VGAM3051 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3051 RNA, herein designated VGAM

RNA, and which when bound by VGAM3051 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3051 host target proteins.

[42681] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3051 gene, herein designated VGAM GENE, on one or more VGAM3051 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42682] It is yet further appreciated that a function of VGAM3051 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3051 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3051 correlate with, and may be deduced from, the identity of the host target genes which VGAM3051 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42683] Nucleotide sequences of the VGAM3051 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3051 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3051 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3051 are further described hereinbelow with reference to Table 1.

[42684] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3051 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42685] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3052 (VGAM3052) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42686] VGAM3052 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3052 was detected is described hereinabove with reference to Figs. 2-8.

[42687] VGAM3052 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Hepatitis C virus. VGAM3052 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42688] VGAM3052 gene, herein designated VGAM GENE, encodes a VGAM3052 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3052 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3052 precursor RNA is designated SEQ ID:69531, and is provided hereinbelow with reference to the sequence listing part.

[42689] VGAM3052 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3052 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42690] An enzyme complex designated DICER COMPLEX, dices the VGAM3052 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3052 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3052 RNA is designated SEQ ID:69532, and is provided hereinbelow with reference to the sequence listing part.

[42691] VGAM3052 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3052 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3052 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42692] VGAM3052 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3052 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3052 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3052 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3052 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42693] The complementary binding of VGAM3052 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3052 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3052 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3052 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42694] It is appreciated that VGAM3052 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3052 host target genes. The mRNA of each one of this plurality of VGAM3052 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3052 RNA, herein designated VGAM RNA, and which when bound by VGAM3052 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3052 host target proteins.

[42695] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3052 gene, herein designated VGAM GENE, on one or more VGAM3052 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42696] It is yet further appreciated that a function of VGAM3052 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3052 include diagnosis, prevention and

treatment of viral infection by Hepatitis C virus. Specific functions, and accordingly utilities, of VGAM3052 correlate with, and may be deduced from, the identity of the host target genes which VGAM3052 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42697] Nucleotide sequences of the VGAM3052 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3052 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3052 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3052 are further described hereinbelow with reference to Table 1.

[42698] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3052 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42699] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3053 (VGAM3053) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42700] VGAM3053 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3053 was detected is described hereinabove with reference to Figs. 2–8.

[42701] VGAM3053 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3053 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42702] VGAM3053 gene, herein designated VGAM GENE, encodes a VGAM3053 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3053 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3053 precursor RNA is designated SEQ ID:69540, and is provided hereinbelow with reference to the sequence listing part.

[42703] VGAM3053 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3053 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42704] An enzyme complex designated DICER COMPLEX, dices the VGAM3053 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3053 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3053 RNA is designated SEQ ID:69541, and is provided hereinbelow with reference to the sequence listing part.

[42705] VGAM3053 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3053 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3053 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42706] VGAM3053 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3053 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3053 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3053 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3053 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42707] The complementary binding of VGAM3053 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3053 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3053 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3053 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42708] It is appreciated that VGAM3053 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3053 host target genes. The mRNA of each one of this plurality of VGAM3053 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3053 RNA, herein designated VGAM RNA, and which when bound by VGAM3053 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3053 host target proteins.

[42709] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3053 gene, herein designated VGAM GENE, on one or more VGAM3053 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42710] It is yet further appreciated that a function of VGAM3053 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3053 include diagnosis, prevention and treatment of viral infection by Amsacta moorei ento-

mopoxvirus. Specific functions, and accordingly utilities, of VGAM3053 correlate with, and may be deduced from, the identity of the host target genes which VGAM3053 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42711] Nucleotide sequences of the VGAM3053 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3053 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3053 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3053 are further described hereinbelow with reference to Table 1.

[42712] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3053 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42713] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3054 (VGAM3054) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[42714] VGAM3054 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3054 was detected is described hereinabove with reference to Figs. 2–8.

[42715] VGAM3054 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3054 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42716] VGAM3054 gene, herein designated VGAM GENE, encodes a VGAM3054 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3054 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3054 precursor RNA is designated SEQ ID:69545, and is provided hereinbelow with reference to the sequence listing part.

[42717] VGAM3054 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3054 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42718] An enzyme complex designated DICER COMPLEX, dices the VGAM3054 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3054 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3054 RNA is designated SEQ ID:69546, and is provided hereinbelow with reference to the sequence listing part.

[42719] VGAM3054 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3054 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3054 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42720] VGAM3054 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3054 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3054 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3054 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3054 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42721] The complementary binding of VGAM3054 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3054 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3054 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3054 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42722] It is appreciated that VGAM3054 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3054 host target genes. The mRNA of each one of this plurality of VGAM3054 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3054 RNA, herein designated VGAM RNA, and which when bound by VGAM3054 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3054 host target proteins.

[42723] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3054 gene, herein designated VGAM GENE, on one or more VGAM3054 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42724] It is yet further appreciated that a function of VGAM3054 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3054 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities,

of VGAM3054 correlate with, and may be deduced from, the identity of the host target genes which VGAM3054 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42725] Nucleotide sequences of the VGAM3054 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3054 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3054 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3054 are further described hereinbelow with reference to Table 1.

[42726] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3054 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42727] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3055 (VGAM3055) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[42728] VGAM3055 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3055 was detected is described hereinabove with reference to Figs. 2–8.

[42729] VGAM3055 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Duck adenovirus A. VGAM3055 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42730] VGAM3055 gene, herein designated VGAM GENE, encodes a VGAM3055 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3055 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3055 precursor RNA is designated SEQ ID:69554, and is provided hereinbelow with reference to the sequence listing part.

[42731] VGAM3055 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3055 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42732] An enzyme complex designated DICER COMPLEX, dices the VGAM3055 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3055 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3055 RNA is designated SEQ ID:69555, and is provided hereinbelow with reference to the sequence listing part.

[42733] VGAM3055 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3055 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3055 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42734] VGAM3055 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3055 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3055 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3055 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3055 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42735] The complementary binding of VGAM3055 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3055 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3055 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3055 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42736] It is appreciated that VGAM3055 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3055 host target genes. The mRNA of each one of this plurality of VGAM3055 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3055 RNA, herein designated VGAM RNA, and which when bound by VGAM3055 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3055 host target proteins.

[42737] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3055 gene, herein designated VGAM GENE, on one or more VGAM3055 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42738] It is yet further appreciated that a function of VGAM3055 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3055 include diagnosis, prevention and treatment of viral infection by Duck adenovirus A. Specific functions, and accordingly utilities, of VGAM3055 correlate with, and may be deduced from, the identity of the

host target genes which VGAM3055 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42739] Nucleotide sequences of the VGAM3055 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3055 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3055 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3055 are further described hereinbelow with reference to Table 1.

[42740] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3055 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42741] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3056 (VGAM3056) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42742] VGAM3056 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3056 was detected is described hereinabove with reference to Figs. 2–8.

[42743] VGAM3056 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3056 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42744] VGAM3056 gene, herein designated VGAM GENE, encodes a VGAM3056 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3056 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3056 precursor RNA is designated SEQ ID:69588, and is provided hereinbelow with reference to the sequence listing part.

[42745] VGAM3056 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3056 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42746] An enzyme complex designated DICER COMPLEX, dices the VGAM3056 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3056 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3056 RNA is designated SEQ ID:69589, and is provided hereinbelow with reference to the sequence listing part.

[42747] VGAM3056 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3056 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3056 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42748] VGAM3056 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3056 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3056 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3056 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3056 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42749] The complementary binding of VGAM3056 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3056 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3056 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3056 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42750] It is appreciated that VGAM3056 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3056 host target genes. The mRNA of each one of this plurality of VGAM3056 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3056 RNA, herein designated VGAM RNA, and which when bound by VGAM3056 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3056 host target proteins.

[42751] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3056 gene, herein designated VGAM GENE, on one or more VGAM3056 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42752] It is yet further appreciated that a function of VGAM3056 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3056 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3056 correlate with, and may be deduced from, the identity of the host target genes which VGAM3056 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[42753] Nucleotide sequences of the VGAM3056 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3056 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3056 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3056 are further described hereinbelow with reference to Table 1.

[42754] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3056 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42755] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3057 (VGAM3057) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42756] VGAM3057 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3057 was detected is described hereinabove with reference to Figs. 2–8.

[42757] VGAM3057 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Reston Ebola virus.

VGAM3057 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42758] VGAM3057 gene, herein designated VGAM GENE, encodes a VGAM3057 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3057 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3057 precursor RNA is designated SEQ ID:69596, and is provided hereinbelow with reference to the sequence listing part.

[42759] VGAM3057 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3057 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42760] An enzyme complex designated DICER COMPLEX, dices the VGAM3057 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3057 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3057 RNA is designated SEQ ID:69597, and is provided hereinbelow with reference to the sequence listing part.

[42761] VGAM3057 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3057 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3057 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42762] VGAM3057 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3057 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3057 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3057 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3057 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[42763] The complementary binding of VGAM3057 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3057 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3057 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3057 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42764] It is appreciated that VGAM3057 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3057 host target genes. The mRNA of each one of this plurality of VGAM3057 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3057 RNA, herein designated VGAM RNA, and which when bound by VGAM3057 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3057 host target proteins.

[42765] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3057 gene, herein designated VGAM GENE, on one or more VGAM3057 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42766] It is yet further appreciated that a function of VGAM3057 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3057 include diagnosis, prevention and treatment of viral infection by Reston Ebola virus. Specific functions, and accordingly utilities, of VGAM3057 correlate with, and may be deduced from, the identity of the host target genes which VGAM3057 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[42767] Nucleotide sequences of the VGAM3057 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3057 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3057 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3057 are further described hereinbelow with reference to Table 1.

[42768] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3057 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42769] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3058 (VGAM3058) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42770] VGAM3058 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3058 was detected is described hereinabove with reference to Figs. 2–8.

[42771] VGAM3058 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Reston Ebola virus.

VGAM3058 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42772] VGAM3058 gene, herein designated VGAM GENE, encodes a VGAM3058 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3058 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3058 precursor RNA is designated SEQ ID:69600, and is provided hereinbelow with reference to the sequence listing part.

[42773] VGAM3058 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3058 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42774] An enzyme complex designated DICER COMPLEX, dices the VGAM3058 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3058 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3058 RNA is designated SEQ ID:69601, and is provided hereinbelow with reference to the sequence listing part.

[42775] VGAM3058 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3058 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3058 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[42776] VGAM3058 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3058 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3058 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3058 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3058 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42777] The complementary binding of VGAM3058 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3058 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3058 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3058 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42778] It is appreciated that VGAM3058 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3058 host target genes. The mRNA of each one of this plurality of VGAM3058 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3058 RNA, herein designated VGAM RNA, and which when bound by VGAM3058 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3058 host target proteins.

[42779] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3058 gene, herein designated VGAM GENE, on one

or more VGAM3058 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42780] It is yet further appreciated that a function of VGAM3058 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3058 include diagnosis, prevention and treatment of viral infection by Reston Ebola virus. Specific functions, and accordingly utilities, of VGAM3058 correlate with, and may be deduced from, the identity of the host target genes which VGAM3058 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42781] Nucleotide sequences of the VGAM3058 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3058 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3058 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3058 are further described hereinbelow with reference to Table 1.

[42782] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3058 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42783] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3059 (VGAM3059) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42784] VGAM3059 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3059 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[42785] VGAM3059 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus.

VGAM3059 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42786] VGAM3059 gene, herein designated VGAM GENE, encodes a VGAM3059 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3059 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3059 precursor RNA is designated SEQ ID:69678, and is provided hereinbelow with reference to the sequence listing part.

[42787] VGAM3059 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3059 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42788] An enzyme complex designated DICER COMPLEX, dices the VGAM3059 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3059 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3059 RNA is designated SEQ ID:69679, and is provided hereinbelow with reference to the sequence listing part.

[42789] VGAM3059 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3059 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3059 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42790] VGAM3059 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3059 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3059 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3059 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3059 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42791] The complementary binding of VGAM3059 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3059 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3059 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3059 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42792] It is appreciated that VGAM3059 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3059 host target genes. The mRNA of each one of this plurality of VGAM3059 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3059 RNA, herein designated VGAM RNA, and which when bound by VGAM3059 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3059 host target proteins.

[42793] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3059 gene, herein designated VGAM GENE, on one or more VGAM3059 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42794] It is yet further appreciated that a function of VGAM3059 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3059 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3059 correlate with, and may be deduced from, the identity of the host target genes which VGAM3059 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42795] Nucleotide sequences of the VGAM3059 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3059 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3059 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3059 are further described hereinbelow with reference to Table 1.

[42796] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3059 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42797] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3060 (VGAM3060) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42798] VGAM3060 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3060 was detected is described hereinabove with reference to Figs. 2-8.

[42799] VGAM3060 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Polyomavirus muris. VGAM3060 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42800] VGAM3060 gene, herein designated VGAM GENE, encodes a VGAM3060 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3060 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3060 precursor RNA is designated SEQ ID:69692, and is provided hereinbelow with reference to the sequence listing part.

[42801] VGAM3060 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3060 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[42802] An enzyme complex designated DICER COMPLEX, dices the VGAM3060 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3060 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3060 RNA is designated SEQ ID:69693, and is provided hereinbelow with reference to the sequence listing part.

[42803] VGAM3060 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3060 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3060 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42804] VGAM3060 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3060 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3060 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3060 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3060 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42805] The complementary binding of VGAM3060 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3060 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3060 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3060 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42806] It is appreciated that VGAM3060 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3060 host target genes. The mRNA of each one of this plurality of VGAM3060 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3060 RNA, herein designated VGAM RNA, and which when bound by VGAM3060 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3060 host target proteins.

[42807] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3060 gene, herein designated VGAM GENE, on one or more VGAM3060 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42808] It is yet further appreciated that a function of VGAM3060 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3060 include diagnosis, prevention and treatment of viral infection by Polyomavirus muris. Specific functions, and accordingly utilities, of VGAM3060 correlate with, and may be deduced from, the identity of the host target genes which VGAM3060 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42809] Nucleotide sequences of the VGAM3060 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3060 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3060 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3060 are further described hereinbelow with reference to Table 1.

[42810] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3060 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42811] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3061 (VGAM3061) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42812] VGAM3061 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3061 was detected is described hereinabove with reference to Figs. 2-8.

[42813] VGAM3061 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of *Macaca mulatta* rhadinovirus. VGAM3061 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42814] VGAM3061 gene, herein designated VGAM GENE, encodes a VGAM3061 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3061 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3061 precursor RNA is designated SEQ ID:69705, and is provided hereinbelow with reference to the sequence listing part.

[42815] VGAM3061 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3061 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42816] An enzyme complex designated DICER COMPLEX, dices the VGAM3061 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3061 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3061 RNA is designated SEQ ID:69706, and is provided hereinbelow with reference to the sequence listing part.

[42817] VGAM3061 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3061 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3061 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42818] VGAM3061 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3061 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3061 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3061 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3061 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42819] The complementary binding of VGAM3061 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3061 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3061 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3061 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42820] It is appreciated that VGAM3061 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3061 host target genes. The mRNA of each one of this plurality of VGAM3061 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3061 RNA, herein designated VGAM RNA, and which when bound by VGAM3061 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3061 host target proteins.

[42821] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3061 gene, herein designated VGAM GENE, on one or more VGAM3061 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42822] It is yet further appreciated that a function of VGAM3061 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3061 include diagnosis, prevention and treatment of viral infection by *Macaca mulatta* rhadinovirus. Specific functions, and accordingly utilities, of VGAM3061 correlate with, and may be deduced from, the identity of the host target genes which VGAM3061 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42823] Nucleotide sequences of the VGAM3061 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3061 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3061 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3061 are further described hereinbelow with reference to Table 1.

[42824] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3061 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42825] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3062 (VGAM3062) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42826] VGAM3062 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3062 was detected is described hereinabove with reference to Figs. 2–8.

[42827] VGAM3062 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus. VGAM3062 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42828] VGAM3062 gene, herein designated VGAM GENE, encodes a VGAM3062 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3062 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3062 precursor RNA is designated SEQ ID:69710, and is provided hereinbelow with reference to the sequence listing part.

[42829] VGAM3062 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3062 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42830] An enzyme complex designated DICER COMPLEX, dices the VGAM3062 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3062 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3062 RNA is designated SEQ ID:69711, and is provided hereinbelow with reference to the sequence listing part.

[42831] VGAM3062 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3062 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3062 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42832] VGAM3062 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3062 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3062 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3062 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3062 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42833] The complementary binding of VGAM3062 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3062 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3062 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3062 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42834] It is appreciated that VGAM3062 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3062 host target genes. The mRNA of each one of this plurality of VGAM3062 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3062 RNA, herein designated VGAM

RNA, and which when bound by VGAM3062 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3062 host target proteins.

[42835] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3062 gene, herein designated VGAM GENE, on one or more VGAM3062 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42836] It is yet further appreciated that a function of VGAM3062 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3062 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3062 correlate with, and may be deduced from, the identity of the host target genes which VGAM3062 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42837] Nucleotide sequences of the VGAM3062 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3062 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3062 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3062 are further described hereinbelow with reference to Table 1.

[42838] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3062 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42839] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3063 (VGAM3063) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42840] VGAM3063 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3063 was detected is described hereinabove with reference to Figs. 2-8.

[42841] VGAM3063 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rana tigrina ranavirus. VGAM3063 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42842] VGAM3063 gene, herein designated VGAM GENE, encodes a VGAM3063 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3063 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3063 precursor RNA is designated SEQ ID:69742, and is provided hereinbelow with reference to the sequence listing part.

[42843] VGAM3063 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3063 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42844] An enzyme complex designated DICER COMPLEX, dices the VGAM3063 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3063 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3063 RNA is designated SEQ ID:69743, and is provided hereinbelow with reference to the sequence listing part.

[42845] VGAM3063 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3063 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3063 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42846] VGAM3063 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3063 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3063 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3063 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3063 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42847] The complementary binding of VGAM3063 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3063 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3063 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3063 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42848] It is appreciated that VGAM3063 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3063 host target genes. The mRNA of each one of this plurality of VGAM3063 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3063 RNA, herein designated VGAM RNA, and which when bound by VGAM3063 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3063 host target proteins.

[42849] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3063 gene, herein designated VGAM GENE, on one or more VGAM3063 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42850] It is yet further appreciated that a function of VGAM3063 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3063 include diagnosis, prevention and

treatment of viral infection by *Rana tigrina* ranavirus. Specific functions, and accordingly utilities, of VGAM3063 correlate with, and may be deduced from, the identity of the host target genes which VGAM3063 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42851] Nucleotide sequences of the VGAM3063 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3063 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3063 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3063 are further described hereinbelow with reference to Table 1.

[42852] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3063 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42853] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3064 (VGAM3064) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42854] VGAM3064 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3064 was detected is described hereinabove with reference to Figs. 2–8.

[42855] VGAM3064 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus. VGAM3064 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42856] VGAM3064 gene, herein designated VGAM GENE, encodes a VGAM3064 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3064 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3064 precursor RNA is designated SEQ ID:69782, and is provided hereinbelow with reference to the sequence listing part.

[42857] VGAM3064 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3064 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42858] An enzyme complex designated DICER COMPLEX, dices the VGAM3064 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3064 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3064 RNA is designated SEQ ID:69783, and is provided hereinbelow with reference to the sequence listing part.

[42859] VGAM3064 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3064 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3064 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42860] VGAM3064 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3064 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3064 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3064 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3064 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42861] The complementary binding of VGAM3064 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3064 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3064 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3064 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42862] It is appreciated that VGAM3064 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3064 host target genes. The mRNA of each one of this plurality of VGAM3064 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3064 RNA, herein designated VGAM RNA, and which when bound by VGAM3064 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3064 host target proteins.

[42863] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3064 gene, herein designated VGAM GENE, on one or more VGAM3064 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42864] It is yet further appreciated that a function of VGAM3064 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3064 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific

functions, and accordingly utilities, of VGAM3064 correlate with, and may be deduced from, the identity of the host target genes which VGAM3064 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42865] Nucleotide sequences of the VGAM3064 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3064 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3064 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3064 are further described hereinbelow with reference to Table 1.

[42866] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3064 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42867] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3065 (VGAM3065) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[42868] VGAM3065 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3065 was detected is described hereinabove with reference to Figs. 2–8.

[42869] VGAM3065 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3065 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42870] VGAM3065 gene, herein designated VGAM GENE, encodes a VGAM3065 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3065 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3065 precursor RNA is designated SEQ ID:69796, and is provided hereinbelow with reference to the sequence listing part.

[42871] VGAM3065 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3065 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42872] An enzyme complex designated DICER COMPLEX, dices the VGAM3065 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3065 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3065 RNA is designated SEQ ID:69797, and is provided hereinbelow with reference to the sequence listing part.

[42873] VGAM3065 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3065 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3065 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42874] VGAM3065 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3065 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3065 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3065 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3065 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42875] The complementary binding of VGAM3065 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3065 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3065 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3065 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42876] It is appreciated that VGAM3065 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3065 host target genes. The mRNA of each one of this plurality of VGAM3065 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3065 RNA, herein designated VGAM RNA, and which when bound by VGAM3065 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3065 host target proteins.

[42877] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3065 gene, herein designated VGAM GENE, on one or more VGAM3065 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42878] It is yet further appreciated that a function of VGAM3065 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3065 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3065

correlate with, and may be deduced from, the identity of the host target genes which VGAM3065 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42879] Nucleotide sequences of the VGAM3065 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3065 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3065 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3065 are further described hereinbelow with reference to Table 1.

[42880] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3065 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42881] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3066 (VGAM3066) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[42882] VGAM3066 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3066 was detected is described hereinabove with reference to Figs. 2–8.

[42883] VGAM3066 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3066 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42884] VGAM3066 gene, herein designated VGAM GENE, encodes a VGAM3066 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3066 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3066 precursor RNA is designated SEQ ID:69830, and is provided hereinbelow with reference to the sequence listing part.

[42885] VGAM3066 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3066 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42886] An enzyme complex designated DICER COMPLEX, dices the VGAM3066 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3066 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3066 RNA is designated SEQ ID:69831, and is provided hereinbelow with reference to the sequence listing part.

[42887] VGAM3066 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3066 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3066 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42888] VGAM3066 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3066 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3066 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3066 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3066 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42889] The complementary binding of VGAM3066 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3066 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3066 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3066 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42890] It is appreciated that VGAM3066 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3066 host target genes. The mRNA of each one of this plurality of VGAM3066 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3066 RNA, herein designated VGAM RNA, and which when bound by VGAM3066 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3066 host target proteins.

[42891] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3066 gene, herein designated VGAM GENE, on one or more VGAM3066 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42892] It is yet further appreciated that a function of VGAM3066 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3066 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3066 correlate with, and may be deduced

from, the identity of the host target genes which VGAM3066 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42893] Nucleotide sequences of the VGAM3066 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3066 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3066 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3066 are further described hereinbelow with reference to Table 1.

[42894] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3066 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42895] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3067 (VGAM3067) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42896] VGAM3067 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3067 was detected is described hereinabove with reference to Figs. 2-8.

[42897] VGAM3067 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3067 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42898] VGAM3067 gene, herein designated VGAM GENE, encodes a VGAM3067 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3067 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3067 precursor RNA is designated SEQ ID:69902, and is provided hereinbelow with reference to the sequence listing part.

[42899] VGAM3067 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3067 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42900] An enzyme complex designated DICER COMPLEX, dices the VGAM3067 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3067 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3067 RNA is designated SEQ ID:69903, and is provided hereinbelow with reference to the sequence listing part.

[42901] VGAM3067 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3067 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3067 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42902] VGAM3067 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3067 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3067 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3067 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3067 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42903] The complementary binding of VGAM3067 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3067 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3067 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3067 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42904] It is appreciated that VGAM3067 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3067 host target genes. The mRNA of each one of this plurality of VGAM3067 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3067 RNA, herein designated VGAM RNA, and which when bound by VGAM3067 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3067 host target proteins.

[42905] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3067 gene, herein designated VGAM GENE, on one or more VGAM3067 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42906] It is yet further appreciated that a function of VGAM3067 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3067 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3067 correlate with, and may be deduced from, the identity of the host target genes which

VGAM3067 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42907] Nucleotide sequences of the VGAM3067 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3067 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3067 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3067 are further described hereinbelow with reference to Table 1.

[42908] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3067 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42909] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3068 (VGAM3068) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42910] VGAM3068 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3068 was detected is described hereinabove with reference to Figs. 2–8.

[42911] VGAM3068 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3068 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42912] VGAM3068 gene, herein designated VGAM GENE, encodes a VGAM3068 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3068 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3068 precursor RNA is designated SEQ ID:69908, and is provided hereinbelow with reference to the sequence listing part.

[42913] VGAM3068 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3068 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42914] An enzyme complex designated DICER COMPLEX, dices the VGAM3068 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3068 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3068 RNA is designated SEQ ID:69909, and is provided hereinbelow with reference to the sequence listing part.

[42915] VGAM3068 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3068 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3068 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42916] VGAM3068 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3068 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3068 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3068 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3068 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[42917] The complementary binding of VGAM3068 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3068 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3068 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3068 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42918] It is appreciated that VGAM3068 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3068 host target genes. The mRNA of each one of this plurality of VGAM3068 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3068 RNA, herein designated VGAM RNA, and which when bound by VGAM3068 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3068 host target proteins.

[42919] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3068 gene, herein designated VGAM GENE, on one or more VGAM3068 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42920] It is yet further appreciated that a function of VGAM3068 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3068 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3068 correlate with, and may be deduced from, the identity of the host target genes which VGAM3068 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[42921] Nucleotide sequences of the VGAM3068 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3068 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3068 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3068 are further described hereinbelow with reference to Table 1.

[42922] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3068 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42923] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3069 (VGAM3069) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42924] VGAM3069 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3069 was detected is described hereinabove with reference to Figs. 2–8.

[42925] VGAM3069 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Porcine teschovirus. VGAM3069 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42926] VGAM3069 gene, herein designated VGAM GENE, encodes a VGAM3069 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3069 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3069 precursor RNA is designated SEQ ID:69921, and is provided hereinbelow with reference to the sequence listing part.

[42927] VGAM3069 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3069 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42928] An enzyme complex designated DICER COMPLEX, dices the VGAM3069 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3069 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3069 RNA is designated SEQ ID:69922, and is provided hereinbelow with reference to the sequence listing part.

[42929] VGAM3069 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3069 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3069 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[42930] VGAM3069 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3069 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3069 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3069 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3069 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42931] The complementary binding of VGAM3069 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3069 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3069 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3069 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42932] It is appreciated that VGAM3069 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3069 host target genes. The mRNA of each one of this plurality of VGAM3069 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3069 RNA, herein designated VGAM RNA, and which when bound by VGAM3069 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3069 host target proteins.

[42933] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3069 gene, herein designated VGAM GENE, on one

or more VGAM3069 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42934] It is yet further appreciated that a function of VGAM3069 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3069 include diagnosis, prevention and treatment of viral infection by Porcine teschovirus. Specific functions, and accordingly utilities, of VGAM3069 correlate with, and may be deduced from, the identity of the host target genes which VGAM3069 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42935] Nucleotide sequences of the VGAM3069 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3069 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3069 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3069 are further described hereinbelow with reference to Table 1.

[42936] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3069 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42937] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3070 (VGAM3070) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42938] VGAM3070 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3070 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[42939] VGAM3070 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Porcine epidemic diarrhea virus. VGAM3070 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42940] VGAM3070 gene, herein designated VGAM GENE, encodes a VGAM3070 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3070 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3070 precursor RNA is designated SEQ ID:69940, and is provided hereinbelow with reference to the sequence listing part.

[42941] VGAM3070 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3070 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42942] An enzyme complex designated DICER COMPLEX, dices the VGAM3070 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3070 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3070 RNA is designated SEQ ID:69941, and is provided hereinbelow with reference to the sequence listing part.

[42943] VGAM3070 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3070 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3070 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42944] VGAM3070 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3070 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3070 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3070 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3070 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42945] The complementary binding of VGAM3070 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3070 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3070 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3070 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42946] It is appreciated that VGAM3070 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3070 host target genes. The mRNA of each one of this plurality of VGAM3070 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3070 RNA, herein designated VGAM RNA, and which when bound by VGAM3070 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3070 host target proteins.

[42947] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3070 gene, herein designated VGAM GENE, on one or more VGAM3070 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42948] It is yet further appreciated that a function of VGAM3070 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3070 include diagnosis, prevention and treatment of viral infection by Porcine epidemic diarrhea virus. Specific functions, and accordingly utilities, of VGAM3070 correlate with, and may be deduced from, the identity of the host target genes which VGAM3070 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42949] Nucleotide sequences of the VGAM3070 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3070 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3070 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3070 are further described hereinbelow with reference to Table 1.

[42950] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3070 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42951] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3071 (VGAM3071) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42952] VGAM3071 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3071 was detected is described hereinabove with reference to Figs. 2-8.

[42953] VGAM3071 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3071 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42954] VGAM3071 gene, herein designated VGAM GENE, encodes a VGAM3071 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3071 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3071 precursor RNA is designated SEQ ID:69949, and is provided hereinbelow with reference to the sequence listing part.

[42955] VGAM3071 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3071 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[42956] An enzyme complex designated DICER COMPLEX, dices the VGAM3071 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3071 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3071 RNA is designated SEQ ID:69950, and is provided hereinbelow with reference to the sequence listing part.

[42957] VGAM3071 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3071 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3071 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42958] VGAM3071 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3071 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3071 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3071 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3071 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42959] The complementary binding of VGAM3071 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3071 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3071 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3071 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42960] It is appreciated that VGAM3071 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3071 host target genes. The mRNA of each one of this plurality of VGAM3071 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3071 RNA, herein designated VGAM RNA, and which when bound by VGAM3071 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3071 host target proteins.

[42961] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3071 gene, herein designated VGAM GENE, on one or more VGAM3071 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42962] It is yet further appreciated that a function of VGAM3071 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3071 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3071 correlate with, and may be deduced from, the identity of the host target genes which VGAM3071 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42963] Nucleotide sequences of the VGAM3071 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3071 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3071 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3071 are further described hereinbelow with reference to Table 1.

[42964] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3071 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42965] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3072 (VGAM3072) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42966] VGAM3072 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3072 was detected is described hereinabove with reference to Figs. 2-8.

[42967] VGAM3072 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Camelpox virus.

VGAM3072 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42968] VGAM3072 gene, herein designated VGAM GENE, encodes a VGAM3072 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3072 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3072 precursor RNA is designated SEQ ID:69963, and is provided hereinbelow with reference to the sequence listing part.

[42969] VGAM3072 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3072 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42970] An enzyme complex designated DICER COMPLEX, dices the VGAM3072 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3072 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3072 RNA is designated SEQ ID:69964, and is provided hereinbelow with reference to the sequence listing part.

[42971] VGAM3072 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3072 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3072 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42972] VGAM3072 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3072 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3072 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3072 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3072 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42973] The complementary binding of VGAM3072 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3072 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3072 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3072 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42974] It is appreciated that VGAM3072 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3072 host target genes. The mRNA of each one of this plurality of VGAM3072 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3072 RNA, herein designated VGAM RNA, and which when bound by VGAM3072 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3072 host target proteins.

[42975] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3072 gene, herein designated VGAM GENE, on one or more VGAM3072 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42976] It is yet further appreciated that a function of VGAM3072 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3072 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3072 correlate with, and may be deduced from, the identity of the host target genes which VGAM3072 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42977] Nucleotide sequences of the VGAM3072 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3072 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3072 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3072 are further described hereinbelow with reference to Table 1.

[42978] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3072 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42979] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3073 (VGAM3073) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42980] VGAM3073 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3073 was detected is described hereinabove with reference to Figs. 2-8.

[42981] VGAM3073 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3073 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[42982] VGAM3073 gene, herein designated VGAM GENE, encodes a VGAM3073 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3073 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3073 precursor RNA is designated SEQ ID:70002, and is provided hereinbelow with reference to the sequence listing part.

[42983] VGAM3073 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3073 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42984] An enzyme complex designated DICER COMPLEX, dices

the VGAM3073 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3073 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3073 RNA is designated SEQ ID:70003, and is provided hereinbelow with reference to the sequence listing part.

[42985] VGAM3073 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3073 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3073 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[42986] VGAM3073 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3073 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3073 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3073 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3073 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[42987] The complementary binding of VGAM3073 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3073 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3073 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3073 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[42988] It is appreciated that VGAM3073 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3073 host target genes. The mRNA of each one of this plurality of VGAM3073 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3073 RNA, herein designated VGAM RNA, and which when bound by VGAM3073 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3073 host target proteins.

[42989] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3073 gene, herein designated VGAM GENE, on one or more VGAM3073 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[42990] It is yet further appreciated that a function of VGAM3073 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3073 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3073 correlate with, and may be deduced from, the identity of the host target genes which VGAM3073 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[42991] Nucleotide sequences of the VGAM3073 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3073 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3073 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3073 are further described hereinbelow with reference to Table 1.

[42992] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3073 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[42993] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3074 (VGAM3074) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[42994] VGAM3074 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3074 was detected is described hereinabove with reference to Figs. 2-8.

[42995] VGAM3074 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus.

VGAM3074 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[42996] VGAM3074 gene, herein designated VGAM GENE, encodes a VGAM3074 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3074 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3074 precursor RNA is designated SEQ ID:70005, and is provided hereinbelow with reference to the sequence listing part.

[42997] VGAM3074 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3074 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[42998] An enzyme complex designated DICER COMPLEX, dices the VGAM3074 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3074 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3074 RNA is designated SEQ ID:70006, and is provided hereinbelow with reference to the sequence listing part.

[42999] VGAM3074 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3074 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3074 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43000] VGAM3074 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3074 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3074 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3074 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3074 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43001] The complementary binding of VGAM3074 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3074 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3074

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3074 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43002] It is appreciated that VGAM3074 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3074 host target genes. The mRNA of each one of this plurality of VGAM3074 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3074 RNA, herein designated VGAM RNA, and which when bound by VGAM3074 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3074 host target proteins.

[43003] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3074 gene, herein designated VGAM GENE, on one or more VGAM3074 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43004] It is yet further appreciated that a function of VGAM3074 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3074 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3074 correlate with, and may be deduced from, the identity of the host target genes which VGAM3074 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43005] Nucleotide sequences of the VGAM3074 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3074 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3074 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3074 are further described hereinbelow with reference to Table 1.

[43006] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3074 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43007] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3075 (VGAM3075) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43008] VGAM3075 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3075 was detected is described hereinabove with reference to Figs. 2-8.

[43009] VGAM3075 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 47. VGAM3075 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[43010] VGAM3075 gene, herein designated VGAM GENE, encodes a VGAM3075 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3075 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3075 precursor RNA is designated SEQ ID:70011, and is provided hereinbelow with reference to the sequence listing part.

[43011] VGAM3075 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3075 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43012] An enzyme complex designated DICER COMPLEX, dices the VGAM3075 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3075 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3075 RNA is designated SEQ ID:70012, and is provided hereinbelow with reference to the sequence listing part.

[43013] VGAM3075 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3075 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3075 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43014] VGAM3075 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3075 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3075 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3075 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3075 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43015] The complementary binding of VGAM3075 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3075 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3075 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3075 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43016] It is appreciated that VGAM3075 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3075 host target genes. The mRNA of each one of this plurality of VGAM3075 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3075 RNA, herein designated VGAM RNA, and which when bound by VGAM3075 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3075 host target proteins.

[43017] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3075 gene, herein designated VGAM GENE, on one or more VGAM3075 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43018] It is yet further appreciated that a function of VGAM3075 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3075 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 47. Specific functions, and accordingly utilities, of VGAM3075 correlate with, and may be deduced from, the identity of the host target genes which VGAM3075 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43019] Nucleotide sequences of the VGAM3075 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3075 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3075 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3075 are further

described hereinbelow with reference to Table 1.

[43020] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3075 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43021] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3076 (VGAM3076) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43022] VGAM3076 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3076 was detected is described hereinabove with reference to Figs. 2-8.

[43023] VGAM3076 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 47. VGAM3076 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43024] VGAM3076 gene, herein designated VGAM GENE, encodes a VGAM3076 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3076 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3076 precursor RNA is designated SEQ ID:70033, and is provided hereinbelow with reference to the sequence listing part.

[43025] VGAM3076 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3076 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43026] An enzyme complex designated DICER COMPLEX, dices the VGAM3076 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3076 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3076 RNA is designated SEQ ID:70034, and is provided hereinbelow with reference to the sequence listing part.

[43027] VGAM3076 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3076 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3076 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43028] VGAM3076 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3076 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3076 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3076 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3076 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43029] The complementary binding of VGAM3076 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3076 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3076 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3076 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43030] It is appreciated that VGAM3076 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3076 host target genes. The mRNA of each one of this plurality of VGAM3076 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3076 RNA, herein designated VGAM RNA, and which when bound by VGAM3076 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3076 host target proteins.

[43031] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3076 gene, herein designated VGAM GENE, on one or more VGAM3076 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43032] It is yet further appreciated that a function of VGAM3076 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3076 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 47. Specific functions, and accordingly utilities, of VGAM3076 correlate with, and may be deduced from, the identity of the host target genes which VGAM3076 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43033] Nucleotide sequences of the VGAM3076 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3076 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3076 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3076 are further described hereinbelow with reference to Table 1.

[43034] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3076 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43035] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3077 (VGAM3077) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43036] VGAM3077 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3077 was detected is described hereinabove with reference to Figs. 2-8.

[43037] VGAM3077 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 7. VGAM3077 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43038] VGAM3077 gene, herein designated VGAM GENE, encodes

a VGAM3077 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3077 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3077 precursor RNA is designated SEQ ID:70047, and is provided hereinbelow with reference to the sequence listing part.

[43039] VGAM3077 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3077 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43040] An enzyme complex designated DICER COMPLEX, dices the VGAM3077 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3077 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3077 RNA is designated SEQ ID:70048, and is provided hereinbelow with reference to the sequence listing part.

[43041] VGAM3077 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3077 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3077 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43042] VGAM3077 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3077 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3077 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3077 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3077 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43043] The complementary binding of VGAM3077 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3077 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3077 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3077 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[43044] It is appreciated that VGAM3077 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3077 host target genes. The mRNA of each one of this plurality of VGAM3077 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3077 RNA, herein designated VGAM RNA, and which when bound by VGAM3077 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3077 host target proteins.

[43045] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3077 gene, herein designated VGAM GENE, on one or more VGAM3077 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43046] It is yet further appreciated that a function of VGAM3077 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3077 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3077 correlate with, and may be deduced from, the identity of the host target genes which VGAM3077 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43047] Nucleotide sequences of the VGAM3077 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3077 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3077 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3077 are further described hereinbelow with reference to Table 1.

[43048] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3077 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43049] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3078 (VGAM3078) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43050] VGAM3078 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3078 was detected is described hereinabove with reference to Figs. 2-8.

[43051] VGAM3078 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 7. VGAM3078 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43052] VGAM3078 gene, herein designated VGAM GENE, encodes a VGAM3078 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3078 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3078 precursor RNA is designated SEQ ID:70051, and is provided hereinbelow with reference to the sequence listing part.

[43053] VGAM3078 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3078 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43054] An enzyme complex designated DICER COMPLEX, dices the VGAM3078 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3078 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3078 RNA is designated SEQ ID:70052, and is provided hereinbelow with reference to the sequence listing part.

[43055] VGAM3078 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3078 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3078 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43056] VGAM3078 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3078 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3078 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3078 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3078 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43057] The complementary binding of VGAM3078 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3078 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3078 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3078 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43058] It is appreciated that VGAM3078 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3078 host target genes. The mRNA of each one of this plurality of VGAM3078 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3078 RNA, herein designated VGAM RNA, and which when bound by VGAM3078 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3078 host target proteins.

[43059] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3078 gene, herein designated VGAM GENE, on one or more VGAM3078 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43060] It is yet further appreciated that a function of VGAM3078 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3078 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3078 correlate with, and may be deduced from, the identity of the host target genes which VGAM3078 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43061] Nucleotide sequences of the VGAM3078 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3078 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3078 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3078 are further described hereinbelow with reference to Table 1.

[43062] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3078 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43063] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3079 (VGAM3079) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43064] VGAM3079 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3079 was detected is described hereinabove with reference to Figs. 2-8.

[43065] VGAM3079 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2. VGAM3079 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43066] VGAM3079 gene, herein designated VGAM GENE, encodes a VGAM3079 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3079 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3079 precursor RNA is designated SEQ ID:70061, and is provided hereinbelow with reference to the sequence listing part.

[43067] VGAM3079 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3079 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43068] An enzyme complex designated DICER COMPLEX, dices the VGAM3079 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3079 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3079 RNA is designated SEQ ID:70062, and is provided hereinbelow with reference to the sequence listing part.

[43069] VGAM3079 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3079 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3079 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43070] VGAM3079 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3079 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3079 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3079 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3079 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43071] The complementary binding of VGAM3079 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3079 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3079 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3079 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43072] It is appreciated that VGAM3079 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3079 host target genes. The mRNA of each one of this plurality of VGAM3079 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3079 RNA, herein designated VGAM RNA, and which when bound by VGAM3079 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3079 host target proteins.

[43073] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3079 gene, herein designated VGAM GENE, on one or more VGAM3079 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43074] It is yet further appreciated that a function of VGAM3079 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3079 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3079 correlate with, and may be deduced from, the identity of the host target genes which VGAM3079 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43075] Nucleotide sequences of the VGAM3079 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3079 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3079 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3079 are further described hereinbelow with reference to Table 1.

[43076] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3079 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43077] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3080 (VGAM3080) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43078] VGAM3080 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3080 was detected is described hereinabove with reference to Figs. 2–8.

[43079] VGAM3080 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3080 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43080] VGAM3080 gene, herein designated VGAM GENE, encodes a VGAM3080 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3080 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3080 precursor RNA is designated SEQ ID:70189, and is provided hereinbelow with reference to the sequence listing part.

[43081] VGAM3080 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3080 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43082] An enzyme complex designated DICER COMPLEX, dices the VGAM3080 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3080 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3080 RNA is designated SEQ ID:70190, and is provided hereinbelow with reference to the sequence listing part.

[43083] VGAM3080 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3080 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3080 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43084] VGAM3080 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3080 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3080 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3080 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3080 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43085] The complementary binding of VGAM3080 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3080 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3080 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3080 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43086] It is appreciated that VGAM3080 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3080 host target genes. The mRNA of each one of this plurality of VGAM3080 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3080 RNA, herein designated VGAM RNA, and which when bound by VGAM3080 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3080 host target proteins.

[43087] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3080 gene, herein designated VGAM GENE, on one or more VGAM3080 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[43088] It is yet further appreciated that a function of VGAM3080 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3080 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3080 correlate with, and may be deduced from, the identity of the host target genes which VGAM3080 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43089] Nucleotide sequences of the VGAM3080 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3080 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3080 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3080 are further described hereinbelow with reference to Table 1.

[43090] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3080 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43091] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3081 (VGAM3081) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43092] VGAM3081 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3081 was detected is described hereinabove with reference to Figs. 2-8.

[43093] VGAM3081 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3081 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43094] VGAM3081 gene, herein designated VGAM GENE, encodes a VGAM3081 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3081 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3081 precursor RNA is designated SEQ ID:70197, and is provided hereinbelow with reference to the sequence listing part.

[43095] VGAM3081 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3081 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43096] An enzyme complex designated DICER COMPLEX, dices the VGAM3081 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3081 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3081 RNA is designated SEQ ID:70198, and is provided hereinbelow with reference to the sequence listing part.

[43097] VGAM3081 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3081 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3081 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43098] VGAM3081 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3081 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3081 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3081 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3081 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43099] The complementary binding of VGAM3081 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3081 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3081 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3081 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43100] It is appreciated that VGAM3081 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3081 host target genes. The mRNA of

each one of this plurality of VGAM3081 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3081 RNA, herein designated VGAM RNA, and which when bound by VGAM3081 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3081 host target proteins.

[43101] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3081 gene, herein designated VGAM GENE, on one or more VGAM3081 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[43102] It is yet further appreciated that a function of VGAM3081 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3081 include diagnosis, prevention and treatment of viral infection by *Paramecium bursaria* Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3081 correlate with, and may be deduced from, the identity of the host target genes which VGAM3081 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43103] Nucleotide sequences of the VGAM3081 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3081 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3081 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3081 are further described hereinbelow with reference to Table 1.

[43104] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3081 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[43105] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3082 (VGAM3082) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43106] VGAM3082 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3082 was detected is described hereinabove with reference to Figs. 2–8.

[43107] VGAM3082 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3082 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43108] VGAM3082 gene, herein designated VGAM GENE, encodes a VGAM3082 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3082 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3082 precursor RNA is designated SEQ ID:70213, and is provided hereinbelow with reference to the sequence listing part.

[43109] VGAM3082 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3082 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43110] An enzyme complex designated DICER COMPLEX, dices the VGAM3082 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3082 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3082 RNA is designated SEQ ID:70214,

and is provided hereinbelow with reference to the sequence listing part.

[43111] VGAM3082 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3082 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3082 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43112] VGAM3082 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3082 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3082 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3082 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3082 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43113] The complementary binding of VGAM3082 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3082 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3082 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3082 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43114] It is appreciated that VGAM3082 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3082 host target genes. The mRNA of each one of this plurality of VGAM3082 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3082 RNA, herein designated VGAM RNA, and which when bound by VGAM3082 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3082 host target proteins.

[43115] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3082 gene, herein designated VGAM GENE, on one or more VGAM3082 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43116] It is yet further appreciated that a function of VGAM3082 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3082 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3082 correlate with, and may be deduced from, the identity of the host target genes which VGAM3082 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43117] Nucleotide sequences of the VGAM3082 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3082 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3082 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3082 are further described hereinbelow with reference to Table 1.

[43118] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3082 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43119] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3083 (VGAM3083) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43120] VGAM3083 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3083 was detected is described hereinabove with reference to Figs. 2–8.

[43121] VGAM3083 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3083 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43122] VGAM3083 gene, herein designated VGAM GENE, encodes a VGAM3083 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3083 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3083 precu-

sor RNA is designated SEQ ID:70226, and is provided hereinbelow with reference to the sequence listing part.

[43123] VGAM3083 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3083 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43124] An enzyme complex designated DICER COMPLEX, dices the VGAM3083 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3083 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3083 RNA is designated SEQ ID:70227, and is provided hereinbelow with reference to the se-

quence listing part.

[43125] VGAM3083 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3083 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3083 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43126] VGAM3083 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3083 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3083 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3083 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3083 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43127] The complementary binding of VGAM3083 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3083 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3083 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3083 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43128] It is appreciated that VGAM3083 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3083 host target genes. The mRNA of each one of this plurality of VGAM3083 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3083 RNA, herein designated VGAM RNA, and which when bound by VGAM3083 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3083 host target proteins.

[43129] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3083 gene, herein designated VGAM GENE, on one or more VGAM3083 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43130] It is yet further appreciated that a function of VGAM3083

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3083 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3083 correlate with, and may be deduced from, the identity of the host target genes which VGAM3083 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43131] Nucleotide sequences of the VGAM3083 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3083 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3083 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3083 are further described hereinbelow with reference to Table 1.

[43132] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3083 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43133] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3084 (VGAM3084) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43134] VGAM3084 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3084 was detected is described hereinabove with reference to Figs. 2–8.

[43135] VGAM3084 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3084 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43136] VGAM3084 gene, herein designated VGAM GENE, encodes a VGAM3084 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3084 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3084 precursor RNA is designated SEQ ID:70238, and is provided

hereinbelow with reference to the sequence listing part.

[43137] VGAM3084 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3084 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43138] An enzyme complex designated DICER COMPLEX, dices the VGAM3084 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3084 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3084 RNA is designated SEQ ID:70239, and is provided hereinbelow with reference to the sequence listing part.

[43139] VGAM3084 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3084 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3084 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43140] VGAM3084 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3084 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3084 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3084 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3084 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43141] The complementary binding of VGAM3084 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3084 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3084 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3084 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43142] It is appreciated that VGAM3084 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3084 host target genes. The mRNA of each one of this plurality of VGAM3084 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3084 RNA, herein designated VGAM RNA, and which when bound by VGAM3084 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3084 host target proteins.

[43143] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3084 gene, herein designated VGAM GENE, on one or more VGAM3084 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43144] It is yet further appreciated that a function of VGAM3084 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3084 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3084 correlate with, and may be deduced from, the identity of the host target genes which VGAM3084 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43145] Nucleotide sequences of the VGAM3084 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3084 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3084 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3084 are further described hereinbelow with reference to Table 1.

[43146] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3084 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43147] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3085 (VGAM3085) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43148] VGAM3085 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3085 was detected is described hereinabove with reference to Figs. 2–8.

[43149] VGAM3085 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus A. VGAM3085 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43150] VGAM3085 gene, herein designated VGAM GENE, encodes a VGAM3085 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3085 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3085 precursor RNA is designated SEQ ID:70277, and is provided hereinbelow with reference to the sequence listing part.

[43151] VGAM3085 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3085 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43152] An enzyme complex designated DICER COMPLEX, dices the VGAM3085 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3085 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3085 RNA is designated SEQ ID:70278, and is provided hereinbelow with reference to the sequence listing part.

[43153] VGAM3085 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3085 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3085 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43154] VGAM3085 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3085 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3085 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3085 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3085 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43155] The complementary binding of VGAM3085 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3085 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3085 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3085 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43156] It is appreciated that VGAM3085 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3085 host target genes. The mRNA of each one of this plurality of VGAM3085 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3085 RNA, herein designated VGAM

RNA, and which when bound by VGAM3085 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3085 host target proteins.

[43157] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3085 gene, herein designated VGAM GENE, on one or more VGAM3085 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43158] It is yet further appreciated that a function of VGAM3085 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3085 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus A. Specific functions, and accordingly utilities, of VGAM3085 correlate with, and may be deduced from, the identity of the host target genes which VGAM3085 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43159] Nucleotide sequences of the VGAM3085 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3085 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3085 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3085 are further described hereinbelow with reference to Table 1.

[43160] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3085 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43161] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3086 (VGAM3086) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43162] VGAM3086 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3086 was detected is described hereinabove with reference to Figs. 2–8.

[43163] VGAM3086 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2. VGAM3086 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43164] VGAM3086 gene, herein designated VGAM GENE, encodes a VGAM3086 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3086 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3086 precursor RNA is designated SEQ ID:70322, and is provided hereinbelow with reference to the sequence listing part.

[43165] VGAM3086 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3086 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43166] An enzyme complex designated DICER COMPLEX, dices the VGAM3086 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3086 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3086 RNA is designated SEQ ID:70323, and is provided hereinbelow with reference to the sequence listing part.

[43167] VGAM3086 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3086 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3086 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43168] VGAM3086 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3086 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3086 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3086 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3086 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43169] The complementary binding of VGAM3086 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3086 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3086 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3086 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43170] It is appreciated that VGAM3086 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3086 host target genes. The mRNA of each one of this plurality of VGAM3086 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3086 RNA, herein designated VGAM RNA, and which when bound by VGAM3086 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3086 host target proteins.

[43171] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3086 gene, herein designated VGAM GENE, on one or more VGAM3086 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43172] It is yet further appreciated that a function of VGAM3086 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3086 include diagnosis, prevention and

treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3086 correlate with, and may be deduced from, the identity of the host target genes which VGAM3086 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43173] Nucleotide sequences of the VGAM3086 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3086 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3086 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3086 are further described hereinbelow with reference to Table 1.

[43174] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3086 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43175] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3087 (VGAM3087) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43176] VGAM3087 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3087 was detected is described hereinabove with reference to Figs. 2–8.

[43177] VGAM3087 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2. VGAM3087 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43178] VGAM3087 gene, herein designated VGAM GENE, encodes a VGAM3087 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3087 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3087 precursor RNA is designated SEQ ID:70329, and is provided hereinbelow with reference to the sequence listing part.

[43179] VGAM3087 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3087 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43180] An enzyme complex designated DICER COMPLEX, dices the VGAM3087 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3087 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3087 RNA is designated SEQ ID:70330, and is provided hereinbelow with reference to the sequence listing part.

[43181] VGAM3087 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3087 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3087 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43182] VGAM3087 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3087 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3087 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3087 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3087 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43183] The complementary binding of VGAM3087 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3087 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3087 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3087 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43184] It is appreciated that VGAM3087 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3087 host target genes. The mRNA of each one of this plurality of VGAM3087 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3087 RNA, herein designated VGAM RNA, and which when bound by VGAM3087 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3087 host target proteins.

[43185] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3087 gene, herein designated VGAM GENE, on one or more VGAM3087 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43186] It is yet further appreciated that a function of VGAM3087 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3087 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Spe-

cific functions, and accordingly utilities, of VGAM3087 correlate with, and may be deduced from, the identity of the host target genes which VGAM3087 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43187] Nucleotide sequences of the VGAM3087 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3087 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3087 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3087 are further described hereinbelow with reference to Table 1.

[43188] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3087 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43189] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3088 (VGAM3088) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[43190] VGAM3088 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3088 was detected is described hereinabove with reference to Figs. 2–8.

[43191] VGAM3088 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine respiratory syncytial virus. VGAM3088 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43192] VGAM3088 gene, herein designated VGAM GENE, encodes a VGAM3088 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3088 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3088 precursor RNA is designated SEQ ID:70335, and is provided hereinbelow with reference to the sequence listing part.

[43193] VGAM3088 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3088 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43194] An enzyme complex designated DICER COMPLEX, dices the VGAM3088 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3088 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3088 RNA is designated SEQ ID:70336, and is provided hereinbelow with reference to the sequence listing part.

[43195] VGAM3088 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3088 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3088 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43196] VGAM3088 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3088 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3088 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3088 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3088 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43197] The complementary binding of VGAM3088 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3088 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3088 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3088 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43198] It is appreciated that VGAM3088 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3088 host target genes. The mRNA of each one of this plurality of VGAM3088 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3088 RNA, herein designated VGAM RNA, and which when bound by VGAM3088 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3088 host target proteins.

[43199] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3088 gene, herein designated VGAM GENE, on one or more VGAM3088 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43200] It is yet further appreciated that a function of VGAM3088 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3088 include diagnosis, prevention and treatment of viral infection by Bovine respiratory syncytial virus. Specific functions, and accordingly utilities, of

VGAM3088 correlate with, and may be deduced from, the identity of the host target genes which VGAM3088 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43201] Nucleotide sequences of the VGAM3088 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3088 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3088 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3088 are further described hereinbelow with reference to Table 1.

[43202] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3088 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43203] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3089 (VGAM3089) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[43204] VGAM3089 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3089 was detected is described hereinabove with reference to Figs. 2–8.

[43205] VGAM3089 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine respiratory syncytial virus. VGAM3089 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43206] VGAM3089 gene, herein designated VGAM GENE, encodes a VGAM3089 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3089 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3089 precursor RNA is designated SEQ ID:70344, and is provided hereinbelow with reference to the sequence listing part.

[43207] VGAM3089 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3089 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43208] An enzyme complex designated DICER COMPLEX, dices the VGAM3089 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3089 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3089 RNA is designated SEQ ID:70345, and is provided hereinbelow with reference to the sequence listing part.

[43209] VGAM3089 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3089 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3089 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43210] VGAM3089 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3089 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3089 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3089 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3089 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43211] The complementary binding of VGAM3089 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3089 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3089 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3089 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43212] It is appreciated that VGAM3089 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3089 host target genes. The mRNA of each one of this plurality of VGAM3089 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3089 RNA, herein designated VGAM RNA, and which when bound by VGAM3089 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3089 host target proteins.

[43213] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3089 gene, herein designated VGAM GENE, on one or more VGAM3089 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43214] It is yet further appreciated that a function of VGAM3089 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3089 include diagnosis, prevention and treatment of viral infection by Bovine respiratory syncytial virus. Specific functions, and accordingly utilities, of VGAM3089 correlate with, and may be deduced from, the

identity of the host target genes which VGAM3089 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43215] Nucleotide sequences of the VGAM3089 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3089 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3089 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3089 are further described hereinbelow with reference to Table 1.

[43216] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3089 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43217] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3090 (VGAM3090) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43218] VGAM3090 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3090 was detected is described hereinabove with reference to Figs. 2–8.

[43219] VGAM3090 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3090 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43220] VGAM3090 gene, herein designated VGAM GENE, encodes a VGAM3090 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3090 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3090 precursor RNA is designated SEQ ID:70353, and is provided hereinbelow with reference to the sequence listing part.

[43221] VGAM3090 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3090 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43222] An enzyme complex designated DICER COMPLEX, dices the VGAM3090 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3090 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3090 RNA is designated SEQ ID:70354, and is provided hereinbelow with reference to the sequence listing part.

[43223] VGAM3090 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3090 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3090 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43224] VGAM3090 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3090 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3090 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3090 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3090 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43225] The complementary binding of VGAM3090 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3090 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3090 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3090 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43226] It is appreciated that VGAM3090 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3090 host target genes. The mRNA of each one of this plurality of VGAM3090 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3090 RNA, herein designated VGAM RNA, and which when bound by VGAM3090 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3090 host target proteins.

[43227] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3090 gene, herein designated VGAM GENE, on one or more VGAM3090 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43228] It is yet further appreciated that a function of VGAM3090 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3090 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3090 correlate with, and may be deduced from, the identity of the host target genes which VGAM3090 binds

and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43229] Nucleotide sequences of the VGAM3090 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3090 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3090 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3090 are further described hereinbelow with reference to Table 1.

[43230] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3090 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43231] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3091 (VGAM3091) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43232] VGAM3091 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3091 was detected is described hereinabove with reference to Figs. 2–8.

[43233] VGAM3091 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ectromelia virus.

VGAM3091 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43234] VGAM3091 gene, herein designated VGAM GENE, encodes a VGAM3091 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3091 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3091 precursor RNA is designated SEQ ID:70366, and is provided hereinbelow with reference to the sequence listing part.

[43235] VGAM3091 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3091 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43236] An enzyme complex designated DICER COMPLEX, dices the VGAM3091 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3091 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3091 RNA is designated SEQ ID:70367, and is provided hereinbelow with reference to the sequence listing part.

[43237] VGAM3091 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3091 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3091 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43238] VGAM3091 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3091 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3091 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3091 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3091 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[43239] The complementary binding of VGAM3091 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3091 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3091 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3091 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43240] It is appreciated that VGAM3091 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3091 host target genes. The mRNA of each one of this plurality of VGAM3091 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3091 RNA, herein designated VGAM RNA, and which when bound by VGAM3091 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3091 host target proteins.

[43241] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3091 gene, herein designated VGAM GENE, on one or more VGAM3091 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43242] It is yet further appreciated that a function of VGAM3091 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3091 include diagnosis, prevention and treatment of viral infection by Ectromelia virus. Specific functions, and accordingly utilities, of VGAM3091 correlate with, and may be deduced from, the identity of the host target genes which VGAM3091 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[43243] Nucleotide sequences of the VGAM3091 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3091 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3091 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3091 are further described hereinbelow with reference to Table 1.

[43244] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3091 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43245] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3092 (VGAM3092) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43246] VGAM3092 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3092 was detected is described hereinabove with reference to Figs. 2–8.

[43247] VGAM3092 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ectromelia virus.

VGAM3092 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43248] VGAM3092 gene, herein designated VGAM GENE, encodes a VGAM3092 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3092 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3092 precursor RNA is designated SEQ ID:70376, and is provided hereinbelow with reference to the sequence listing part.

[43249] VGAM3092 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3092 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43250] An enzyme complex designated DICER COMPLEX, dices the VGAM3092 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3092 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3092 RNA is designated SEQ ID:70377, and is provided hereinbelow with reference to the sequence listing part.

[43251] VGAM3092 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3092 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3092 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[43252] VGAM3092 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3092 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3092 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3092 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3092 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43253] The complementary binding of VGAM3092 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3092 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3092 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3092 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43254] It is appreciated that VGAM3092 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3092 host target genes. The mRNA of each one of this plurality of VGAM3092 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3092 RNA, herein designated VGAM RNA, and which when bound by VGAM3092 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3092 host target proteins.

[43255] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3092 gene, herein designated VGAM GENE, on one

or more VGAM3092 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43256] It is yet further appreciated that a function of VGAM3092 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3092 include diagnosis, prevention and treatment of viral infection by Ectromelia virus. Specific functions, and accordingly utilities, of VGAM3092 correlate with, and may be deduced from, the identity of the host target genes which VGAM3092 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43257] Nucleotide sequences of the VGAM3092 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3092 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3092 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3092 are further described hereinbelow with reference to Table 1.

[43258] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3092 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43259] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3093 (VGAM3093) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43260] VGAM3093 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3093 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[43261] VGAM3093 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Potato virus Y.

VGAM3093 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43262] VGAM3093 gene, herein designated VGAM GENE, encodes a VGAM3093 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3093 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3093 precursor RNA is designated SEQ ID:70382, and is provided hereinbelow with reference to the sequence listing part.

[43263] VGAM3093 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3093 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43264] An enzyme complex designated DICER COMPLEX, dices the VGAM3093 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3093 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3093 RNA is designated SEQ ID:70383, and is provided hereinbelow with reference to the sequence listing part.

[43265] VGAM3093 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3093 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3093 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43266] VGAM3093 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3093 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3093 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3093 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3093 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43267] The complementary binding of VGAM3093 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3093 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3093 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3093 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43268] It is appreciated that VGAM3093 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3093 host target genes. The mRNA of each one of this plurality of VGAM3093 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3093 RNA, herein designated VGAM RNA, and which when bound by VGAM3093 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3093 host target proteins.

[43269] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3093 gene, herein designated VGAM GENE, on one or more VGAM3093 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43270] It is yet further appreciated that a function of VGAM3093 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3093 include diagnosis, prevention and treatment of viral infection by Potato virus Y. Specific functions, and accordingly utilities, of VGAM3093 correlate with, and may be deduced from, the identity of the host target genes which VGAM3093 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43271] Nucleotide sequences of the VGAM3093 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3093 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3093 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3093 are further described hereinbelow with reference to Table 1.

[43272] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3093 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43273] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3094 (VGAM3094) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43274] VGAM3094 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3094 was detected is described hereinabove with reference to Figs. 2-8.

[43275] VGAM3094 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Potato virus Y.

VGAM3094 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43276] VGAM3094 gene, herein designated VGAM GENE, encodes a VGAM3094 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3094 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3094 precursor RNA is designated SEQ ID:70393, and is provided hereinbelow with reference to the sequence listing part.

[43277] VGAM3094 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3094 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[43278] An enzyme complex designated DICER COMPLEX, dices the VGAM3094 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3094 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3094 RNA is designated SEQ ID:70394, and is provided hereinbelow with reference to the sequence listing part.

[43279] VGAM3094 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3094 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3094 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43280] VGAM3094 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3094 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3094 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3094 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3094 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43281] The complementary binding of VGAM3094 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3094 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3094 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3094 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43282] It is appreciated that VGAM3094 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3094 host target genes. The mRNA of each one of this plurality of VGAM3094 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3094 RNA, herein designated VGAM RNA, and which when bound by VGAM3094 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3094 host target proteins.

[43283] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3094 gene, herein designated VGAM GENE, on one or more VGAM3094 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43284] It is yet further appreciated that a function of VGAM3094 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3094 include diagnosis, prevention and treatment of viral infection by Potato virus Y. Specific functions, and accordingly utilities, of VGAM3094 correlate with, and may be deduced from, the identity of the host target genes which VGAM3094 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43285] Nucleotide sequences of the VGAM3094 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3094 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3094 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3094 are further described hereinbelow with reference to Table 1.

[43286] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3094 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43287] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3095 (VGAM3095) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43288] VGAM3095 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3095 was detected is described hereinabove with reference to Figs. 2-8.

[43289] VGAM3095 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Infectious spleen and kidney necrosis virus. VGAM3095 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43290] VGAM3095 gene, herein designated VGAM GENE, encodes a VGAM3095 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3095 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3095 precursor RNA is designated SEQ ID:70402, and is provided hereinbelow with reference to the sequence listing part.

[43291] VGAM3095 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3095 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43292] An enzyme complex designated DICER COMPLEX, dices the VGAM3095 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3095 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3095 RNA is designated SEQ ID:70403, and is provided hereinbelow with reference to the sequence listing part.

[43293] VGAM3095 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3095 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3095 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43294] VGAM3095 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3095 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3095 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3095 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3095 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43295] The complementary binding of VGAM3095 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3095 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3095 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3095 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43296] It is appreciated that VGAM3095 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3095 host target genes. The mRNA of each one of this plurality of VGAM3095 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3095 RNA, herein designated VGAM RNA, and which when bound by VGAM3095 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3095 host target proteins.

[43297] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3095 gene, herein designated VGAM GENE, on one or more VGAM3095 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43298] It is yet further appreciated that a function of VGAM3095 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3095 include diagnosis, prevention and treatment of viral infection by Infectious spleen and kidney necrosis virus. Specific functions, and accordingly utilities, of VGAM3095 correlate with, and may be deduced from, the identity of the host target genes which VGAM3095 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43299] Nucleotide sequences of the VGAM3095 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3095 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3095 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3095 are further described hereinbelow with reference to Table 1.

[43300] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3095 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43301] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3096 (VGAM3096) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43302] VGAM3096 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3096 was detected is described hereinabove with reference to Figs. 2-8.

[43303] VGAM3096 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious spleen and

kidney necrosis virus. VGAM3096 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43304] VGAM3096 gene, herein designated VGAM GENE, encodes a VGAM3096 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3096 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3096 precursor RNA is designated SEQ ID:70420, and is provided hereinbelow with reference to the sequence listing part.

[43305] VGAM3096 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3096 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43306] An enzyme complex designated DICER COMPLEX, dices

the VGAM3096 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3096 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3096 RNA is designated SEQ ID:70421, and is provided hereinbelow with reference to the sequence listing part.

[43307] VGAM3096 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3096 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3096 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43308] VGAM3096 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3096 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3096 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3096 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3096 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43309] The complementary binding of VGAM3096 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3096 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3096 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3096 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43310] It is appreciated that VGAM3096 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3096 host target genes. The mRNA of each one of this plurality of VGAM3096 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3096 RNA, herein designated VGAM RNA, and which when bound by VGAM3096 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3096 host target proteins.

[43311] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3096 gene, herein designated VGAM GENE, on one or more VGAM3096 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43312] It is yet further appreciated that a function of VGAM3096 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3096 include diagnosis, prevention and treatment of viral infection by Infectious spleen and kidney necrosis virus. Specific functions, and accordingly utilities, of VGAM3096 correlate with, and may be deduced from, the identity of the host target genes which VGAM3096 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43313] Nucleotide sequences of the VGAM3096 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3096 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3096 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3096 are further described hereinbelow with reference to Table 1.

[43314] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3096 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43315] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3097 (VGAM3097) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43316] VGAM3097 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3097 was detected is described hereinabove with reference to Figs. 2-8.

[43317] VGAM3097 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3097 host target gene, herein desig-

nated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43318] VGAM3097 gene, herein designated VGAM GENE, encodes a VGAM3097 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3097 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3097 precursor RNA is designated SEQ ID:70428, and is provided hereinbelow with reference to the sequence listing part.

[43319] VGAM3097 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3097 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43320] An enzyme complex designated DICER COMPLEX, dices the VGAM3097 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3097 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3097 RNA is designated SEQ ID:70429, and is provided hereinbelow with reference to the sequence listing part.

[43321] VGAM3097 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3097 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3097 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43322] VGAM3097 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3097 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3097 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3097 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3097 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43323] The complementary binding of VGAM3097 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3097 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3097

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3097 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43324] It is appreciated that VGAM3097 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3097 host target genes. The mRNA of each one of this plurality of VGAM3097 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3097 RNA, herein designated VGAM RNA, and which when bound by VGAM3097 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3097 host target proteins.

[43325] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3097 gene, herein designated VGAM GENE, on one or more VGAM3097 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43326] It is yet further appreciated that a function of VGAM3097 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3097 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3097 correlate with, and may be deduced from, the identity of the host target genes which VGAM3097 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43327] Nucleotide sequences of the VGAM3097 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3097 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3097 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3097 are further described hereinbelow with reference to Table 1.

[43328] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3097 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43329] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3098 (VGAM3098) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43330] VGAM3098 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3098 was detected is described hereinabove with reference to Figs. 2-8.

[43331] VGAM3098 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3098 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene con-

tained in the human genome.

[43332] VGAM3098 gene, herein designated VGAM GENE, encodes a VGAM3098 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3098 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3098 precursor RNA is designated SEQ ID:70441, and is provided hereinbelow with reference to the sequence listing part.

[43333] VGAM3098 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3098 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43334] An enzyme complex designated DICER COMPLEX, dices the VGAM3098 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3098 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3098 RNA is designated SEQ ID:70442, and is provided hereinbelow with reference to the sequence listing part.

[43335] VGAM3098 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3098 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3098 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43336] VGAM3098 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3098 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3098 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3098 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3098 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43337] The complementary binding of VGAM3098 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3098 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3098 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3098 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43338] It is appreciated that VGAM3098 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3098 host target genes. The mRNA of each one of this plurality of VGAM3098 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3098 RNA, herein designated VGAM RNA, and which when bound by VGAM3098 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3098 host target proteins.

[43339] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3098 gene, herein designated VGAM GENE, on one or more VGAM3098 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43340] It is yet further appreciated that a function of VGAM3098 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3098 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3098 correlate with, and may be deduced from, the identity of the host target genes which VGAM3098 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43341] Nucleotide sequences of the VGAM3098 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3098 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3098 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3098 are further

described hereinbelow with reference to Table 1.

[43342] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3098 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43343] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3099 (VGAM3099) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43344] VGAM3099 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3099 was detected is described hereinabove with reference to Figs. 2-8.

[43345] VGAM3099 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3099 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43346] VGAM3099 gene, herein designated VGAM GENE, encodes a VGAM3099 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3099 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3099 precursor RNA is designated SEQ ID:70489, and is provided hereinbelow with reference to the sequence listing part.

[43347] VGAM3099 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3099 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43348] An enzyme complex designated DICER COMPLEX, dices the VGAM3099 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3099 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3099 RNA is designated SEQ ID:70490, and is provided hereinbelow with reference to the sequence listing part.

[43349] VGAM3099 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3099 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3099 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43350] VGAM3099 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3099 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3099 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3099 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3099 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43351] The complementary binding of VGAM3099 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3099 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3099 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3099 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43352] It is appreciated that VGAM3099 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3099 host target genes. The mRNA of each one of this plurality of VGAM3099 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3099 RNA, herein designated VGAM RNA, and which when bound by VGAM3099 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3099 host target proteins.

[43353] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3099 gene, herein designated VGAM GENE, on one or more VGAM3099 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43354] It is yet further appreciated that a function of VGAM3099 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3099 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3099 correlate with, and may be deduced from, the identity of the host target genes which VGAM3099 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43355] Nucleotide sequences of the VGAM3099 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3099 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3099 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3099 are further described hereinbelow with reference to Table 1.

[43356] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3099 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43357] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3100 (VGAM3100) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43358] VGAM3100 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3100 was detected is described hereinabove with reference to Figs. 2-8.

[43359] VGAM3100 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6B. VGAM3100 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43360] VGAM3100 gene, herein designated VGAM GENE, encodes

a VGAM3100 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3100 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3100 precursor RNA is designated SEQ ID:70520, and is provided hereinbelow with reference to the sequence listing part.

[43361] VGAM3100 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3100 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43362] An enzyme complex designated DICER COMPLEX, dices the VGAM3100 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3100 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3100 RNA is designated SEQ ID:70521, and is provided hereinbelow with reference to the sequence listing part.

[43363] VGAM3100 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3100 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3100 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43364] VGAM3100 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3100 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3100 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3100 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3100 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43365] The complementary binding of VGAM3100 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3100 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3100 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3100 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[43366] It is appreciated that VGAM3100 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3100 host target genes. The mRNA of each one of this plurality of VGAM3100 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3100 RNA, herein designated VGAM RNA, and which when bound by VGAM3100 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3100 host target proteins.

[43367] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3100 gene, herein designated VGAM GENE, on one or more VGAM3100 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43368] It is yet further appreciated that a function of VGAM3100 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3100 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6B. Specific functions, and accordingly utilities, of VGAM3100 correlate with, and may be deduced from, the identity of the host target genes which VGAM3100 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43369] Nucleotide sequences of the VGAM3100 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3100 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3100 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3100 are further described hereinbelow with reference to Table 1.

[43370] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3100 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43371] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3101 (VGAM3101) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43372] VGAM3101 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3101 was detected is described hereinabove with reference to Figs. 2-8.

[43373] VGAM3101 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6B. VGAM3101 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43374] VGAM3101 gene, herein designated VGAM GENE, encodes a VGAM3101 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3101 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3101 precursor RNA is designated SEQ ID:70536, and is provided hereinbelow with reference to the sequence listing part.

[43375] VGAM3101 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3101 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43376] An enzyme complex designated DICER COMPLEX, dices the VGAM3101 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3101 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3101 RNA is designated SEQ ID:70537, and is provided hereinbelow with reference to the sequence listing part.

[43377] VGAM3101 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3101 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3101 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43378] VGAM3101 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3101 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3101 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3101 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3101 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43379] The complementary binding of VGAM3101 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3101 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3101 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3101 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43380] It is appreciated that VGAM3101 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3101 host target genes. The mRNA of each one of this plurality of VGAM3101 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3101 RNA, herein designated VGAM RNA, and which when bound by VGAM3101 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3101 host target proteins.

[43381] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3101 gene, herein designated VGAM GENE, on one or more VGAM3101 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43382] It is yet further appreciated that a function of VGAM3101 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3101 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6B. Specific functions, and accordingly utilities, of VGAM3101 correlate with, and may be deduced from, the identity of the host target genes which VGAM3101 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43383] Nucleotide sequences of the VGAM3101 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3101 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3101 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3101 are further described hereinbelow with reference to Table 1.

[43384] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3101 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43385] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3102 (VGAM3102) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43386] VGAM3102 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3102 was detected is described hereinabove with reference to Figs. 2-8.

[43387] VGAM3102 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3102 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43388] VGAM3102 gene, herein designated VGAM GENE, encodes a VGAM3102 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3102 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3102 precursor RNA is designated SEQ ID:70543, and is provided hereinbelow with reference to the sequence listing part.

[43389] VGAM3102 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3102 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43390] An enzyme complex designated DICER COMPLEX, dices the VGAM3102 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3102 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3102 RNA is designated SEQ ID:70544, and is provided hereinbelow with reference to the sequence listing part.

[43391] VGAM3102 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3102 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3102 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43392] VGAM3102 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3102 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3102 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3102 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3102 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43393] The complementary binding of VGAM3102 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3102 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3102 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3102 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43394] It is appreciated that VGAM3102 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3102 host target genes. The mRNA of each one of this plurality of VGAM3102 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3102 RNA, herein designated VGAM RNA, and which when bound by VGAM3102 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3102 host target proteins.

[43395] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3102 gene, herein designated VGAM GENE, on one or more VGAM3102 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43396] It is yet further appreciated that a function of VGAM3102 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3102 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3102 correlate with, and may be deduced from, the identity of the host target genes which VGAM3102 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43397] Nucleotide sequences of the VGAM3102 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3102 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3102 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3102 are further described hereinbelow with reference to Table 1.

[43398] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3102 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43399] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3103 (VGAM3103) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43400] VGAM3103 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3103 was detected is described hereinabove with reference to Figs. 2–8.

[43401] VGAM3103 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3103 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43402] VGAM3103 gene, herein designated VGAM GENE, encodes a VGAM3103 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3103 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3103 precursor RNA is designated SEQ ID:70703, and is provided hereinbelow with reference to the sequence listing part.

[43403] VGAM3103 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3103 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43404] An enzyme complex designated DICER COMPLEX, dices the VGAM3103 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3103 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3103 RNA is designated SEQ ID:70704, and is provided hereinbelow with reference to the sequence listing part.

[43405] VGAM3103 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3103 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3103 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43406] VGAM3103 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3103 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3103 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3103 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3103 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43407] The complementary binding of VGAM3103 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3103 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3103 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3103 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43408] It is appreciated that VGAM3103 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3103 host target genes. The mRNA of each one of this plurality of VGAM3103 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3103 RNA, herein designated VGAM RNA, and which when bound by VGAM3103 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3103 host target proteins.

[43409] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3103 gene, herein designated VGAM GENE, on one or more VGAM3103 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[43410] It is yet further appreciated that a function of VGAM3103 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3103 include diagnosis, prevention and treatment of viral infection by Mollusum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3103 correlate with, and may be deduced from, the identity of the host target genes which VGAM3103 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43411] Nucleotide sequences of the VGAM3103 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3103 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3103 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3103 are further described hereinbelow with reference to Table 1.

[43412] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3103 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43413] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3104 (VGAM3104) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43414] VGAM3104 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3104 was detected is described hereinabove with reference to Figs. 2-8.

[43415] VGAM3104 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3104 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43416] VGAM3104 gene, herein designated VGAM GENE, encodes a VGAM3104 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3104 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3104 precursor RNA is designated SEQ ID:70733, and is provided hereinbelow with reference to the sequence listing part.

[43417] VGAM3104 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3104 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43418] An enzyme complex designated DICER COMPLEX, dices the VGAM3104 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3104 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3104 RNA is designated SEQ ID:70734, and is provided hereinbelow with reference to the sequence listing part.

[43419] VGAM3104 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3104 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3104 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43420] VGAM3104 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3104 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3104 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3104 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3104 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43421] The complementary binding of VGAM3104 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3104 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3104 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3104 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43422] It is appreciated that VGAM3104 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3104 host target genes. The mRNA of

each one of this plurality of VGAM3104 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3104 RNA, herein designated VGAM RNA, and which when bound by VGAM3104 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3104 host target proteins.

[43423] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3104 gene, herein designated VGAM GENE, on one or more VGAM3104 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[43424] It is yet further appreciated that a function of VGAM3104 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3104 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3104 correlate with, and may be deduced from, the identity of the host target genes which VGAM3104 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43425] Nucleotide sequences of the VGAM3104 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3104 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3104 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3104 are further described hereinbelow with reference to Table 1.

[43426] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3104 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[43427] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3105 (VGAM3105) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43428] VGAM3105 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3105 was detected is described hereinabove with reference to Figs. 2–8.

[43429] VGAM3105 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3105 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43430] VGAM3105 gene, herein designated VGAM GENE, encodes a VGAM3105 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3105 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3105 precursor RNA is designated SEQ ID:70769, and is provided hereinbelow with reference to the sequence listing part.

[43431] VGAM3105 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3105 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43432] An enzyme complex designated DICER COMPLEX, dices the VGAM3105 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3105 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3105 RNA is designated SEQ ID:70770,

and is provided hereinbelow with reference to the sequence listing part.

[43433] VGAM3105 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3105 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3105 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43434] VGAM3105 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3105 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3105 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3105 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3105 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43435] The complementary binding of VGAM3105 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3105 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3105 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3105 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43436] It is appreciated that VGAM3105 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3105 host target genes. The mRNA of each one of this plurality of VGAM3105 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3105 RNA, herein designated VGAM RNA, and which when bound by VGAM3105 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3105 host target proteins.

[43437] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3105 gene, herein designated VGAM GENE, on one or more VGAM3105 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43438] It is yet further appreciated that a function of VGAM3105 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3105 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3105 correlate with, and may be deduced from, the identity of the host target genes which VGAM3105 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43439] Nucleotide sequences of the VGAM3105 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3105 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3105 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3105 are further described hereinbelow with reference to Table 1.

[43440] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3105 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43441] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3106 (VGAM3106) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43442] VGAM3106 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3106 was detected is described hereinabove with reference to Figs. 2–8.

[43443] VGAM3106 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Porcine adenovirus C. VGAM3106 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43444] VGAM3106 gene, herein designated VGAM GENE, encodes a VGAM3106 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3106 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3106 precu-

sor RNA is designated SEQ ID:70774, and is provided hereinbelow with reference to the sequence listing part.

[43445] VGAM3106 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3106 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43446] An enzyme complex designated DICER COMPLEX, dices the VGAM3106 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3106 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3106 RNA is designated SEQ ID:70775, and is provided hereinbelow with reference to the se-

quence listing part.

[43447] VGAM3106 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3106 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3106 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43448] VGAM3106 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3106 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3106 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3106 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3106 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43449] The complementary binding of VGAM3106 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3106 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3106 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3106 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43450] It is appreciated that VGAM3106 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3106 host target genes. The mRNA of each one of this plurality of VGAM3106 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3106 RNA, herein designated VGAM RNA, and which when bound by VGAM3106 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3106 host target proteins.

[43451] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3106 gene, herein designated VGAM GENE, on one or more VGAM3106 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43452] It is yet further appreciated that a function of VGAM3106

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3106 include diagnosis, prevention and treatment of viral infection by Porcine adenovirus C. Specific functions, and accordingly utilities, of VGAM3106 correlate with, and may be deduced from, the identity of the host target genes which VGAM3106 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43453] Nucleotide sequences of the VGAM3106 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3106 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3106 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3106 are further described hereinbelow with reference to Table 1.

[43454] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3106 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43455] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3107 (VGAM3107) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43456] VGAM3107 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3107 was detected is described hereinabove with reference to Figs. 2–8.

[43457] VGAM3107 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3107 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43458] VGAM3107 gene, herein designated VGAM GENE, encodes a VGAM3107 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3107 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3107 precursor RNA is designated SEQ ID:70789, and is provided

hereinbelow with reference to the sequence listing part.

[43459] VGAM3107 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3107 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43460] An enzyme complex designated DICER COMPLEX, dices the VGAM3107 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3107 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3107 RNA is designated SEQ ID:70790, and is provided hereinbelow with reference to the sequence listing part.

[43461] VGAM3107 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3107 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3107 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43462] VGAM3107 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3107 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3107 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3107 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3107 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43463] The complementary binding of VGAM3107 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3107 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3107 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3107 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43464] It is appreciated that VGAM3107 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3107 host target genes. The mRNA of each one of this plurality of VGAM3107 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3107 RNA, herein designated VGAM RNA, and which when bound by VGAM3107 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3107 host target proteins.

[43465] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3107 gene, herein designated VGAM GENE, on one or more VGAM3107 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43466] It is yet further appreciated that a function of VGAM3107 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3107 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3107 correlate with, and may be deduced from, the identity of the host target genes which VGAM3107 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43467] Nucleotide sequences of the VGAM3107 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3107 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3107 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3107 are further described hereinbelow with reference to Table 1.

[43468] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3107 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43469] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3108 (VGAM3108) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43470] VGAM3108 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3108 was detected is described hereinabove with reference to Figs. 2–8.

[43471] VGAM3108 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus. VGAM3108 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43472] VGAM3108 gene, herein designated VGAM GENE, encodes a VGAM3108 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3108 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3108 precursor RNA is designated SEQ ID:70796, and is provided hereinbelow with reference to the sequence listing part.

[43473] VGAM3108 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3108 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43474] An enzyme complex designated DICER COMPLEX, dices the VGAM3108 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3108 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3108 RNA is designated SEQ ID:70797, and is provided hereinbelow with reference to the sequence listing part.

[43475] VGAM3108 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3108 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3108 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43476] VGAM3108 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3108 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3108 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3108 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3108 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43477] The complementary binding of VGAM3108 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3108 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3108 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3108 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43478] It is appreciated that VGAM3108 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3108 host target genes. The mRNA of each one of this plurality of VGAM3108 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3108 RNA, herein designated VGAM

RNA, and which when bound by VGAM3108 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3108 host target proteins.

[43479] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3108 gene, herein designated VGAM GENE, on one or more VGAM3108 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43480] It is yet further appreciated that a function of VGAM3108 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3108 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3108 correlate with, and may be deduced from, the identity of the host target genes which VGAM3108 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43481] Nucleotide sequences of the VGAM3108 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3108 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3108 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3108 are further described hereinbelow with reference to Table 1.

[43482] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3108 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43483] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3109 (VGAM3109) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43484] VGAM3109 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3109 was detected is described hereinabove with reference to Figs. 2–8.

[43485] VGAM3109 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus. VGAM3109 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43486] VGAM3109 gene, herein designated VGAM GENE, encodes a VGAM3109 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3109 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3109 precursor RNA is designated SEQ ID:70813, and is provided hereinbelow with reference to the sequence listing part.

[43487] VGAM3109 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3109 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43488] An enzyme complex designated DICER COMPLEX, dices the VGAM3109 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3109 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3109 RNA is designated SEQ ID:70814, and is provided hereinbelow with reference to the sequence listing part.

[43489] VGAM3109 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3109 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3109 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43490] VGAM3109 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3109 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3109 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3109 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3109 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43491] The complementary binding of VGAM3109 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3109 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3109 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3109 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43492] It is appreciated that VGAM3109 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3109 host target genes. The mRNA of each one of this plurality of VGAM3109 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3109 RNA, herein designated VGAM RNA, and which when bound by VGAM3109 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3109 host target proteins.

[43493] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3109 gene, herein designated VGAM GENE, on one or more VGAM3109 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43494] It is yet further appreciated that a function of VGAM3109 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3109 include diagnosis, prevention and

treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3109 correlate with, and may be deduced from, the identity of the host target genes which VGAM3109 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43495] Nucleotide sequences of the VGAM3109 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3109 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3109 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3109 are further described hereinbelow with reference to Table 1.

[43496] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3109 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43497] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3110 (VGAM3110) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43498] VGAM3110 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3110 was detected is described hereinabove with reference to Figs. 2–8.

[43499] VGAM3110 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Variola virus. VGAM3110 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43500] VGAM3110 gene, herein designated VGAM GENE, encodes a VGAM3110 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3110 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3110 precursor RNA is designated SEQ ID:70818, and is provided hereinbelow with reference to the sequence listing part.

[43501] VGAM3110 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3110 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43502] An enzyme complex designated DICER COMPLEX, dices the VGAM3110 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3110 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3110 RNA is designated SEQ ID:70770, and is provided hereinbelow with reference to the sequence listing part.

[43503] VGAM3110 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3110 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3110 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43504] VGAM3110 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3110 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3110 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3110 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3110 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43505] The complementary binding of VGAM3110 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3110 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3110 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3110 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43506] It is appreciated that VGAM3110 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3110 host target genes. The mRNA of each one of this plurality of VGAM3110 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3110 RNA, herein designated VGAM RNA, and which when bound by VGAM3110 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3110 host target proteins.

[43507] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3110 gene, herein designated VGAM GENE, on one or more VGAM3110 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43508] It is yet further appreciated that a function of VGAM3110 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3110 include diagnosis, prevention and treatment of viral infection by Variola virus. Specific functions, and accordingly utilities, of VGAM3110 correlate

with, and may be deduced from, the identity of the host target genes which VGAM3110 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43509] Nucleotide sequences of the VGAM3110 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3110 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3110 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3110 are further described hereinbelow with reference to Table 1.

[43510] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3110 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43511] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3111 (VGAM3111) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[43512] VGAM3111 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3111 was detected is described hereinabove with reference to Figs. 2–8.

[43513] VGAM3111 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine papillomavirus. VGAM3111 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43514] VGAM3111 gene, herein designated VGAM GENE, encodes a VGAM3111 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3111 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3111 precursor RNA is designated SEQ ID:70819, and is provided hereinbelow with reference to the sequence listing part.

[43515] VGAM3111 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3111 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43516] An enzyme complex designated DICER COMPLEX, dices the VGAM3111 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3111 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3111 RNA is designated SEQ ID:70820, and is provided hereinbelow with reference to the sequence listing part.

[43517] VGAM3111 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3111 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3111 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43518] VGAM3111 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3111 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3111 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3111 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3111 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43519] The complementary binding of VGAM3111 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3111 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3111 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3111 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43520] It is appreciated that VGAM3111 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3111 host target genes. The mRNA of each one of this plurality of VGAM3111 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3111 RNA, herein designated VGAM RNA, and which when bound by VGAM3111 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3111 host target proteins.

[43521] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3111 gene, herein designated VGAM GENE, on one or more VGAM3111 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43522] It is yet further appreciated that a function of VGAM3111 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3111 include diagnosis, prevention and treatment of viral infection by Bovine papillomavirus. Specific functions, and accordingly utilities, of VGAM3111 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3111 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43523] Nucleotide sequences of the VGAM3111 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3111 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3111 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3111 are further described hereinbelow with reference to Table 1.

[43524] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3111 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43525] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3112 (VGAM3112) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43526] VGAM3112 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3112 was detected is described hereinabove with reference to Figs. 2–8.

[43527] VGAM3112 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 4. VGAM3112 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43528] VGAM3112 gene, herein designated VGAM GENE, encodes a VGAM3112 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3112 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3112 precursor RNA is designated SEQ ID:70830, and is provided hereinbelow with reference to the sequence listing part.

[43529] VGAM3112 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3112 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43530] An enzyme complex designated DICER COMPLEX, dices the VGAM3112 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3112 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3112 RNA is designated SEQ ID:70831, and is provided hereinbelow with reference to the sequence listing part.

[43531] VGAM3112 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3112 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3112 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43532] VGAM3112 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3112 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3112 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3112 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3112 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43533] The complementary binding of VGAM3112 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3112 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3112 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3112 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43534] It is appreciated that VGAM3112 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3112 host target genes. The mRNA of each one of this plurality of VGAM3112 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3112 RNA, herein designated VGAM RNA, and which when bound by VGAM3112 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3112 host target proteins.

[43535] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3112 gene, herein designated VGAM GENE, on one or more VGAM3112 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43536] It is yet further appreciated that a function of VGAM3112 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3112 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3112 correlate with, and may be deduced from, the identity of the host target genes which VGAM3112 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[43537] Nucleotide sequences of the VGAM3112 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3112 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3112 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3112 are further described hereinbelow with reference to Table 1.

[43538] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3112 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43539] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3113 (VGAM3113) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43540] VGAM3113 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3113 was detected is described hereinabove with reference to Figs. 2–8.

[43541] VGAM3113 gene, herein designated VGAM GENE, is a viral gene contained in the genome of *Rana tigrina* ranavirus. VGAM3113 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43542] VGAM3113 gene, herein designated VGAM GENE, encodes a VGAM3113 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3113 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3113 precursor RNA is designated SEQ ID:70843, and is provided hereinbelow with reference to the sequence listing part.

[43543] VGAM3113 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3113 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43544] An enzyme complex designated DICER COMPLEX, dices the VGAM3113 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3113 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3113 RNA is designated SEQ ID:70844, and is provided hereinbelow with reference to the sequence listing part.

[43545] VGAM3113 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3113 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3113 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43546] VGAM3113 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3113 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3113 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3113 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3113 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[43547] The complementary binding of VGAM3113 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3113 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3113 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3113 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43548] It is appreciated that VGAM3113 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3113 host target genes. The mRNA of each one of this plurality of VGAM3113 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3113 RNA, herein designated VGAM RNA, and which when bound by VGAM3113 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3113 host target proteins.

[43549] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3113 gene, herein designated VGAM GENE, on one or more VGAM3113 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43550] It is yet further appreciated that a function of VGAM3113 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3113 include diagnosis, prevention and treatment of viral infection by Rana tigrina ranavirus. Specific functions, and accordingly utilities, of VGAM3113 correlate with, and may be deduced from, the identity of the host target genes which VGAM3113 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[43551] Nucleotide sequences of the VGAM3113 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3113 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3113 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3113 are further described hereinbelow with reference to Table 1.

[43552] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3113 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43553] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3114 (VGAM3114) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43554] VGAM3114 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3114 was detected is described hereinabove with reference to Figs. 2–8.

[43555] VGAM3114 gene, herein designated VGAM GENE, is a viral gene contained in the genome of *Rana tigrina* ranavirus. VGAM3114 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43556] VGAM3114 gene, herein designated VGAM GENE, encodes a VGAM3114 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3114 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3114 precursor RNA is designated SEQ ID:70853, and is provided hereinbelow with reference to the sequence listing part.

[43557] VGAM3114 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3114 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43558] An enzyme complex designated DICER COMPLEX, dices the VGAM3114 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3114 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3114 RNA is designated SEQ ID:70854, and is provided hereinbelow with reference to the sequence listing part.

[43559] VGAM3114 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3114 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3114 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[43560] VGAM3114 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3114 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3114 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3114 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3114 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43561] The complementary binding of VGAM3114 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3114 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3114 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3114 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43562] It is appreciated that VGAM3114 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3114 host target genes. The mRNA of each one of this plurality of VGAM3114 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3114 RNA, herein designated VGAM RNA, and which when bound by VGAM3114 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3114 host target proteins.

[43563] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3114 gene, herein designated VGAM GENE, on one

or more VGAM3114 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43564] It is yet further appreciated that a function of VGAM3114 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3114 include diagnosis, prevention and treatment of viral infection by Rana tigrina ranavirus. Specific functions, and accordingly utilities, of VGAM3114 correlate with, and may be deduced from, the identity of the host target genes which VGAM3114 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43565] Nucleotide sequences of the VGAM3114 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3114 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3114 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3114 are further described hereinbelow with reference to Table 1.

[43566] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3114 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43567] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3115 (VGAM3115) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43568] VGAM3115 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3115 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[43569] VGAM3115 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3115 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43570] VGAM3115 gene, herein designated VGAM GENE, encodes a VGAM3115 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3115 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3115 precursor RNA is designated SEQ ID:70861, and is provided hereinbelow with reference to the sequence listing part.

[43571] VGAM3115 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3115 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43572] An enzyme complex designated DICER COMPLEX, dices the VGAM3115 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3115 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3115 RNA is designated SEQ ID:70862, and is provided hereinbelow with reference to the sequence listing part.

[43573] VGAM3115 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3115 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3115 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43574] VGAM3115 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3115 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3115 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3115 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3115 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43575] The complementary binding of VGAM3115 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3115 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3115 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3115 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43576] It is appreciated that VGAM3115 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3115 host target genes. The mRNA of each one of this plurality of VGAM3115 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3115 RNA, herein designated VGAM RNA, and which when bound by VGAM3115 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3115 host target proteins.

[43577] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3115 gene, herein designated VGAM GENE, on one or more VGAM3115 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43578] It is yet further appreciated that a function of VGAM3115 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3115 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3115 correlate with, and may be deduced from, the identity of the host target genes which VGAM3115 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43579] Nucleotide sequences of the VGAM3115 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3115 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3115 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3115 are further described hereinbelow with reference to Table 1.

[43580] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3115 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43581] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3116 (VGAM3116) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43582] VGAM3116 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3116 was detected is described hereinabove with reference to Figs. 2-8.

[43583] VGAM3116 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Alcelaphine herpesvirus 1. VGAM3116 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43584] VGAM3116 gene, herein designated VGAM GENE, encodes a VGAM3116 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3116 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3116 precursor RNA is designated SEQ ID:70868, and is provided hereinbelow with reference to the sequence listing part.

[43585] VGAM3116 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3116 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[43586] An enzyme complex designated DICER COMPLEX, dices the VGAM3116 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3116 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3116 RNA is designated SEQ ID:70869, and is provided hereinbelow with reference to the sequence listing part.

[43587] VGAM3116 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3116 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3116 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43588] VGAM3116 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3116 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3116 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3116 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3116 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43589] The complementary binding of VGAM3116 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3116 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3116 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3116 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43590] It is appreciated that VGAM3116 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3116 host target genes. The mRNA of each one of this plurality of VGAM3116 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3116 RNA, herein designated VGAM RNA, and which when bound by VGAM3116 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3116 host target proteins.

[43591] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3116 gene, herein designated VGAM GENE, on one or more VGAM3116 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43592] It is yet further appreciated that a function of VGAM3116 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3116 include diagnosis, prevention and treatment of viral infection by Alcelaphine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3116 correlate with, and may be deduced from, the identity of the host target genes which VGAM3116 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43593] Nucleotide sequences of the VGAM3116 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3116 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3116 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3116 are further described hereinbelow with reference to Table 1.

[43594] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3116 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43595] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3117 (VGAM3117) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43596] VGAM3117 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3117 was detected is described hereinabove with reference to Figs. 2-8.

[43597] VGAM3117 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Human papillomavirus type 36. VGAM3117 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43598] VGAM3117 gene, herein designated VGAM GENE, encodes a VGAM3117 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3117 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3117 precursor RNA is designated SEQ ID:70894, and is provided hereinbelow with reference to the sequence listing part.

[43599] VGAM3117 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3117 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43600] An enzyme complex designated DICER COMPLEX, dices the VGAM3117 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3117 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3117 RNA is designated SEQ ID:70895, and is provided hereinbelow with reference to the sequence listing part.

[43601] VGAM3117 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3117 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3117 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43602] VGAM3117 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3117 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3117 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3117 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3117 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43603] The complementary binding of VGAM3117 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3117 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3117 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3117 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43604] It is appreciated that VGAM3117 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3117 host target genes. The mRNA of each one of this plurality of VGAM3117 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3117 RNA, herein designated VGAM RNA, and which when bound by VGAM3117 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3117 host target proteins.

[43605] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3117 gene, herein designated VGAM GENE, on one or more VGAM3117 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43606] It is yet further appreciated that a function of VGAM3117 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3117 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 36. Specific functions, and accordingly utilities, of VGAM3117 correlate with, and may be deduced from, the identity of the host target genes which VGAM3117 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43607] Nucleotide sequences of the VGAM3117 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3117 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3117 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3117 are further described hereinbelow with reference to Table 1.

[43608] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3117 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43609] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3118 (VGAM3118) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43610] VGAM3118 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3118 was detected is described hereinabove with reference to Figs. 2-8.

[43611] VGAM3118 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus.

VGAM3118 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43612] VGAM3118 gene, herein designated VGAM GENE, encodes a VGAM3118 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3118 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3118 precursor RNA is designated SEQ ID:70904, and is provided hereinbelow with reference to the sequence listing part.

[43613] VGAM3118 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3118 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43614] An enzyme complex designated DICER COMPLEX, dices

the VGAM3118 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3118 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3118 RNA is designated SEQ ID:70905, and is provided hereinbelow with reference to the sequence listing part.

[43615] VGAM3118 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3118 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3118 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43616] VGAM3118 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3118 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3118 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3118 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3118 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43617] The complementary binding of VGAM3118 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3118 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3118 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3118 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43618] It is appreciated that VGAM3118 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3118 host target genes. The mRNA of each one of this plurality of VGAM3118 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3118 RNA, herein designated VGAM RNA, and which when bound by VGAM3118 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3118 host target proteins.

[43619] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3118 gene, herein designated VGAM GENE, on one or more VGAM3118 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43620] It is yet further appreciated that a function of VGAM3118 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3118 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3118 correlate with, and may be deduced from, the identity of the host target genes which VGAM3118 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43621] Nucleotide sequences of the VGAM3118 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3118 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3118 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3118 are further described hereinbelow with reference to Table 1.

[43622] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3118 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43623] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3119 (VGAM3119) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43624] VGAM3119 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3119 was detected is described hereinabove with reference to Figs. 2-8.

[43625] VGAM3119 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human adenovirus A. VGAM3119 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[43626] VGAM3119 gene, herein designated VGAM GENE, encodes a VGAM3119 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3119 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3119 precursor RNA is designated SEQ ID:70911, and is provided hereinbelow with reference to the sequence listing part.

[43627] VGAM3119 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3119 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43628] An enzyme complex designated DICER COMPLEX, dices the VGAM3119 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3119 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3119 RNA is designated SEQ ID:70912, and is provided hereinbelow with reference to the sequence listing part.

[43629] VGAM3119 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3119 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3119 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43630] VGAM3119 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3119 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3119 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3119 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3119 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43631] The complementary binding of VGAM3119 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3119 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3119

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3119 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43632] It is appreciated that VGAM3119 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3119 host target genes. The mRNA of each one of this plurality of VGAM3119 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3119 RNA, herein designated VGAM RNA, and which when bound by VGAM3119 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3119 host target proteins.

[43633] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3119 gene, herein designated VGAM GENE, on one or more VGAM3119 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43634] It is yet further appreciated that a function of VGAM3119 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3119 include diagnosis, prevention and treatment of viral infection by Human adenovirus A. Specific functions, and accordingly utilities, of VGAM3119 correlate with, and may be deduced from, the identity of the host target genes which VGAM3119 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43635] Nucleotide sequences of the VGAM3119 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3119 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3119 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3119 are further described hereinbelow with reference to Table 1.

[43636] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3119 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43637] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3120 (VGAM3120) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43638] VGAM3120 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3120 was detected is described hereinabove with reference to Figs. 2-8.

[43639] VGAM3120 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 20. VGAM3120 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[43640] VGAM3120 gene, herein designated VGAM GENE, encodes a VGAM3120 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3120 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3120 precursor RNA is designated SEQ ID:70929, and is provided hereinbelow with reference to the sequence listing part.

[43641] VGAM3120 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3120 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43642] An enzyme complex designated DICER COMPLEX, dices the VGAM3120 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3120 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3120 RNA is designated SEQ ID:70930, and is provided hereinbelow with reference to the sequence listing part.

[43643] VGAM3120 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3120 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3120 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43644] VGAM3120 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3120 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3120 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3120 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3120 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43645] The complementary binding of VGAM3120 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3120 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3120 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3120 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43646] It is appreciated that VGAM3120 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3120 host target genes. The mRNA of each one of this plurality of VGAM3120 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3120 RNA, herein designated VGAM RNA, and which when bound by VGAM3120 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3120 host target proteins.

[43647] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3120 gene, herein designated VGAM GENE, on one or more VGAM3120 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43648] It is yet further appreciated that a function of VGAM3120 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3120 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 20. Specific functions, and accordingly utilities, of VGAM3120 correlate with, and may be deduced from, the identity of the host target genes which VGAM3120 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43649] Nucleotide sequences of the VGAM3120 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3120 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3120 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3120 are further

described hereinbelow with reference to Table 1.

[43650] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3120 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43651] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3121 (VGAM3121) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43652] VGAM3121 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3121 was detected is described hereinabove with reference to Figs. 2-8.

[43653] VGAM3121 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pea early browning virus. VGAM3121 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43654] VGAM3121 gene, herein designated VGAM GENE, encodes a VGAM3121 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3121 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3121 precursor RNA is designated SEQ ID:70950, and is provided hereinbelow with reference to the sequence listing part.

[43655] VGAM3121 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3121 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43656] An enzyme complex designated DICER COMPLEX, dices the VGAM3121 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3121 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3121 RNA is designated SEQ ID:70951, and is provided hereinbelow with reference to the sequence listing part.

[43657] VGAM3121 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3121 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3121 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43658] VGAM3121 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3121 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3121 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3121 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3121 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43659] The complementary binding of VGAM3121 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3121 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3121 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3121 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43660] It is appreciated that VGAM3121 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3121 host target genes. The mRNA of each one of this plurality of VGAM3121 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3121 RNA, herein designated VGAM RNA, and which when bound by VGAM3121 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3121 host target proteins.

[43661] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3121 gene, herein designated VGAM GENE, on one or more VGAM3121 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43662] It is yet further appreciated that a function of VGAM3121 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3121 include diagnosis, prevention and treatment of viral infection by Pea early browning virus. Specific functions, and accordingly utilities, of VGAM3121 correlate with, and may be deduced from, the identity of the host target genes which VGAM3121 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43663] Nucleotide sequences of the VGAM3121 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3121 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3121 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3121 are further described hereinbelow with reference to Table 1.

[43664] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3121 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43665] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3122 (VGAM3122) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43666] VGAM3122 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3122 was detected is described hereinabove with reference to Figs. 2-8.

[43667] VGAM3122 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Oat golden stripe virus. VGAM3122 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43668] VGAM3122 gene, herein designated VGAM GENE, encodes

a VGAM3122 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3122 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3122 precursor RNA is designated SEQ ID:70960, and is provided hereinbelow with reference to the sequence listing part.

[43669] VGAM3122 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3122 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43670] An enzyme complex designated DICER COMPLEX, dices the VGAM3122 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3122 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3122 RNA is designated SEQ ID:70961, and is provided hereinbelow with reference to the sequence listing part.

[43671] VGAM3122 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3122 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3122 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43672] VGAM3122 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3122 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3122 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3122 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3122 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43673] The complementary binding of VGAM3122 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3122 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3122 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3122 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[43674] It is appreciated that VGAM3122 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3122 host target genes. The mRNA of each one of this plurality of VGAM3122 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3122 RNA, herein designated VGAM RNA, and which when bound by VGAM3122 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3122 host target proteins.

[43675] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3122 gene, herein designated VGAM GENE, on one or more VGAM3122 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43676] It is yet further appreciated that a function of VGAM3122 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3122 include diagnosis, prevention and treatment of viral infection by Oat golden stripe virus. Specific functions, and accordingly utilities, of VGAM3122 correlate with, and may be deduced from, the identity of the host target genes which VGAM3122 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43677] Nucleotide sequences of the VGAM3122 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3122 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3122 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3122 are further described hereinbelow with reference to Table 1.

[43678] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3122 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43679] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3123 (VGAM3123) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43680] VGAM3123 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3123 was detected is described hereinabove with reference to Figs. 2-8.

[43681] VGAM3123 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3123 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43682] VGAM3123 gene, herein designated VGAM GENE, encodes a VGAM3123 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3123 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3123 precursor RNA is designated SEQ ID:70977, and is provided hereinbelow with reference to the sequence listing part.

[43683] VGAM3123 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3123 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43684] An enzyme complex designated DICER COMPLEX, dices the VGAM3123 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3123 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3123 RNA is designated SEQ ID:70978, and is provided hereinbelow with reference to the sequence listing part.

[43685] VGAM3123 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3123 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3123 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43686] VGAM3123 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3123 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3123 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3123 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3123 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43687] The complementary binding of VGAM3123 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3123 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3123 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3123 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43688] It is appreciated that VGAM3123 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3123 host target genes. The mRNA of each one of this plurality of VGAM3123 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3123 RNA, herein designated VGAM RNA, and which when bound by VGAM3123 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3123 host target proteins.

[43689] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3123 gene, herein designated VGAM GENE, on one or more VGAM3123 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43690] It is yet further appreciated that a function of VGAM3123 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3123 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3123 correlate with, and may be deduced from, the identity of the host target genes which VGAM3123 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43691] Nucleotide sequences of the VGAM3123 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3123 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3123 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3123 are further described hereinbelow with reference to Table 1.

[43692] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3123 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43693] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3124 (VGAM3124) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43694] VGAM3124 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3124 was detected is described hereinabove with reference to Figs. 2-8.

[43695] VGAM3124 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3124 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43696] VGAM3124 gene, herein designated VGAM GENE, encodes a VGAM3124 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3124 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3124 precursor RNA is designated SEQ ID:70985, and is provided hereinbelow with reference to the sequence listing part.

[43697] VGAM3124 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3124 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43698] An enzyme complex designated DICER COMPLEX, dices the VGAM3124 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3124 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3124 RNA is designated SEQ ID:70986, and is provided hereinbelow with reference to the sequence listing part.

[43699] VGAM3124 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3124 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3124 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43700] VGAM3124 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3124 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3124 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3124 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3124 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43701] The complementary binding of VGAM3124 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3124 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3124 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3124 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43702] It is appreciated that VGAM3124 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3124 host target genes. The mRNA of each one of this plurality of VGAM3124 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3124 RNA, herein designated VGAM RNA, and which when bound by VGAM3124 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3124 host target proteins.

[43703] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3124 gene, herein designated VGAM GENE, on one or more VGAM3124 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43704] It is yet further appreciated that a function of VGAM3124 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3124 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3124 correlate with, and may be deduced from, the identity of the host target genes which VGAM3124 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43705] Nucleotide sequences of the VGAM3124 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3124 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3124 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3124 are further described hereinbelow with reference to Table 1.

[43706] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3124 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43707] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3125 (VGAM3125) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43708] VGAM3125 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3125 was detected is described hereinabove with reference to Figs. 2–8.

[43709] VGAM3125 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 2. VGAM3125 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43710] VGAM3125 gene, herein designated VGAM GENE, encodes a VGAM3125 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3125 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3125 precursor RNA is designated SEQ ID:70990, and is provided hereinbelow with reference to the sequence listing part.

[43711] VGAM3125 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3125 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43712] An enzyme complex designated DICER COMPLEX, dices the VGAM3125 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3125 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3125 RNA is designated SEQ ID:70991, and is provided hereinbelow with reference to the sequence listing part.

[43713] VGAM3125 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3125 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3125 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43714] VGAM3125 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3125 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3125 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3125 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3125 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43715] The complementary binding of VGAM3125 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3125 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3125 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3125 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43716] It is appreciated that VGAM3125 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3125 host target genes. The mRNA of each one of this plurality of VGAM3125 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3125 RNA, herein designated VGAM RNA, and which when bound by VGAM3125 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3125 host target proteins.

[43717] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3125 gene, herein designated VGAM GENE, on one or more VGAM3125 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [43718] It is yet further appreciated that a function of VGAM3125 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3125 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3125 correlate with, and may be deduced from, the identity of the host target genes which VGAM3125 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [43719] Nucleotide sequences of the VGAM3125 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3125 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3125 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3125 are further described hereinbelow with reference to Table 1.
- [43720] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3125 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43721] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3126 (VGAM3126) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43722] VGAM3126 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3126 was detected is described hereinabove with reference to Figs. 2-8.

[43723] VGAM3126 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3126 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43724] VGAM3126 gene, herein designated VGAM GENE, encodes a VGAM3126 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3126 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3126 precursor RNA is designated SEQ ID:71023, and is provided hereinbelow with reference to the sequence listing part.

[43725] VGAM3126 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3126 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43726] An enzyme complex designated DICER COMPLEX, dices the VGAM3126 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3126 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3126 RNA is designated SEQ ID:71024, and is provided hereinbelow with reference to the sequence listing part.

[43727] VGAM3126 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3126 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3126 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43728] VGAM3126 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3126 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3126 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3126 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3126 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43729] The complementary binding of VGAM3126 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3126 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3126 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3126 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43730] It is appreciated that VGAM3126 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3126 host target genes. The mRNA of

each one of this plurality of VGAM3126 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3126 RNA, herein designated VGAM RNA, and which when bound by VGAM3126 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3126 host target proteins.

[43731] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3126 gene, herein designated VGAM GENE, on one or more VGAM3126 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[43732] It is yet further appreciated that a function of VGAM3126 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3126 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3126 correlate with, and may be deduced from, the identity of the host target genes which VGAM3126 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43733] Nucleotide sequences of the VGAM3126 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3126 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3126 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3126 are further described hereinbelow with reference to Table 1.

[43734] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3126 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[43735] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3127 (VGAM3127) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43736] VGAM3127 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3127 was detected is described hereinabove with reference to Figs. 2–8.

[43737] VGAM3127 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 32. VGAM3127 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43738] VGAM3127 gene, herein designated VGAM GENE, encodes a VGAM3127 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3127 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3127 precursor RNA is designated SEQ ID:71045, and is provided hereinbelow with reference to the sequence listing part.

[43739] VGAM3127 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3127 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43740] An enzyme complex designated DICER COMPLEX, dices the VGAM3127 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3127 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3127 RNA is designated SEQ ID:71046,

and is provided hereinbelow with reference to the sequence listing part.

[43741] VGAM3127 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3127 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3127 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43742] VGAM3127 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3127 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3127 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3127 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3127 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43743] The complementary binding of VGAM3127 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3127 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3127 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3127 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43744] It is appreciated that VGAM3127 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3127 host target genes. The mRNA of each one of this plurality of VGAM3127 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3127 RNA, herein designated VGAM RNA, and which when bound by VGAM3127 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3127 host target proteins.

[43745] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3127 gene, herein designated VGAM GENE, on one or more VGAM3127 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43746] It is yet further appreciated that a function of VGAM3127 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3127 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 32. Specific functions, and accordingly utilities, of VGAM3127 correlate with, and may be deduced from, the identity of the host target genes which VGAM3127 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43747] Nucleotide sequences of the VGAM3127 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3127 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3127 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3127 are further described hereinbelow with reference to Table 1.

[43748] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3127 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43749] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3128 (VGAM3128) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43750] VGAM3128 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3128 was detected is described hereinabove with reference to Figs. 2–8.

[43751] VGAM3128 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 38. VGAM3128 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43752] VGAM3128 gene, herein designated VGAM GENE, encodes a VGAM3128 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3128 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3128 precu-

sor RNA is designated SEQ ID:71087, and is provided hereinbelow with reference to the sequence listing part.

[43753] VGAM3128 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3128 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43754] An enzyme complex designated DICER COMPLEX, dices the VGAM3128 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3128 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3128 RNA is designated SEQ ID:71088, and is provided hereinbelow with reference to the se-

quence listing part.

[43755] VGAM3128 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3128 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3128 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43756] VGAM3128 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3128 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3128 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3128 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3128 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43757] The complementary binding of VGAM3128 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3128 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3128 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3128 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43758] It is appreciated that VGAM3128 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3128 host target genes. The mRNA of each one of this plurality of VGAM3128 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3128 RNA, herein designated VGAM RNA, and which when bound by VGAM3128 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3128 host target proteins.

[43759] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3128 gene, herein designated VGAM GENE, on one or more VGAM3128 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43760] It is yet further appreciated that a function of VGAM3128

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3128 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 38. Specific functions, and accordingly utilities, of VGAM3128 correlate with, and may be deduced from, the identity of the host target genes which VGAM3128 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43761] Nucleotide sequences of the VGAM3128 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3128 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3128 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3128 are further described hereinbelow with reference to Table 1.

[43762] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3128 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43763] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3129 (VGAM3129) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43764] VGAM3129 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3129 was detected is described hereinabove with reference to Figs. 2–8.

[43765] VGAM3129 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus. VGAM3129 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43766] VGAM3129 gene, herein designated VGAM GENE, encodes a VGAM3129 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3129 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3129 precursor RNA is designated SEQ ID:71095, and is provided

hereinbelow with reference to the sequence listing part.

[43767] VGAM3129 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3129 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43768] An enzyme complex designated DICER COMPLEX, dices the VGAM3129 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3129 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3129 RNA is designated SEQ ID:71096, and is provided hereinbelow with reference to the sequence listing part.

[43769] VGAM3129 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3129 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3129 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43770] VGAM3129 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3129 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3129 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3129 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3129 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43771] The complementary binding of VGAM3129 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3129 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3129 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3129 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43772] It is appreciated that VGAM3129 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3129 host target genes. The mRNA of each one of this plurality of VGAM3129 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3129 RNA, herein designated VGAM RNA, and which when bound by VGAM3129 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3129 host target proteins.

[43773] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3129 gene, herein designated VGAM GENE, on one or more VGAM3129 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43774] It is yet further appreciated that a function of VGAM3129 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3129 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3129 correlate with, and may be deduced from, the identity of the host target genes which VGAM3129 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43775] Nucleotide sequences of the VGAM3129 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3129 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3129 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3129 are further described hereinbelow with reference to Table 1.

[43776] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3129 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43777] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3130 (VGAM3130) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43778] VGAM3130 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3130 was detected is described hereinabove with reference to Figs. 2–8.

[43779] VGAM3130 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3130 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43780] VGAM3130 gene, herein designated VGAM GENE, encodes a VGAM3130 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3130 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3130 precursor RNA is designated SEQ ID:71107, and is provided hereinbelow with reference to the sequence listing part.

[43781] VGAM3130 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3130 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43782] An enzyme complex designated DICER COMPLEX, dices the VGAM3130 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3130 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3130 RNA is designated SEQ ID:71108, and is provided hereinbelow with reference to the sequence listing part.

[43783] VGAM3130 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3130 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3130 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43784] VGAM3130 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3130 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3130 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3130 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3130 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43785] The complementary binding of VGAM3130 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3130 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3130 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3130 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43786] It is appreciated that VGAM3130 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3130 host target genes. The mRNA of each one of this plurality of VGAM3130 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3130 RNA, herein designated VGAM

RNA, and which when bound by VGAM3130 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3130 host target proteins.

[43787] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3130 gene, herein designated VGAM GENE, on one or more VGAM3130 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43788] It is yet further appreciated that a function of VGAM3130 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3130 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3130 correlate with, and may be deduced from, the identity of the host target genes which VGAM3130 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43789] Nucleotide sequences of the VGAM3130 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3130 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3130 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3130 are further described hereinbelow with reference to Table 1.

[43790] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3130 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43791] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3131 (VGAM3131) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43792] VGAM3131 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3131 was detected is described hereinabove with reference to Figs. 2-8.

[43793] VGAM3131 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3131 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43794] VGAM3131 gene, herein designated VGAM GENE, encodes a VGAM3131 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3131 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3131 precursor RNA is designated SEQ ID:71115, and is provided hereinbelow with reference to the sequence listing part.

[43795] VGAM3131 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3131 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43796] An enzyme complex designated DICER COMPLEX, dices the VGAM3131 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3131 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3131 RNA is designated SEQ ID:71116, and is provided hereinbelow with reference to the sequence listing part.

[43797] VGAM3131 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3131 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3131 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43798] VGAM3131 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3131 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3131 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3131 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3131 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43799] The complementary binding of VGAM3131 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3131 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3131 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3131 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43800] It is appreciated that VGAM3131 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3131 host target genes. The mRNA of each one of this plurality of VGAM3131 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3131 RNA, herein designated VGAM RNA, and which when bound by VGAM3131 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3131 host target proteins.

[43801] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3131 gene, herein designated VGAM GENE, on one or more VGAM3131 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43802] It is yet further appreciated that a function of VGAM3131 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3131 include diagnosis, prevention and

treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3131 correlate with, and may be deduced from, the identity of the host target genes which VGAM3131 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43803] Nucleotide sequences of the VGAM3131 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3131 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3131 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3131 are further described hereinbelow with reference to Table 1.

[43804] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3131 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43805] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3132 (VGAM3132) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43806] VGAM3132 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3132 was detected is described hereinabove with reference to Figs. 2–8.

[43807] VGAM3132 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6. VGAM3132 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43808] VGAM3132 gene, herein designated VGAM GENE, encodes a VGAM3132 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3132 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3132 precursor RNA is designated SEQ ID:71122, and is provided hereinbelow with reference to the sequence listing part.

[43809] VGAM3132 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3132 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43810] An enzyme complex designated DICER COMPLEX, dices the VGAM3132 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3132 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3132 RNA is designated SEQ ID:71123, and is provided hereinbelow with reference to the sequence listing part.

[43811] VGAM3132 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3132 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3132 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43812] VGAM3132 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3132 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3132 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3132 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3132 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43813] The complementary binding of VGAM3132 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3132 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3132 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3132 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43814] It is appreciated that VGAM3132 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3132 host target genes. The mRNA of each one of this plurality of VGAM3132 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3132 RNA, herein designated VGAM RNA, and which when bound by VGAM3132 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3132 host target proteins.

[43815] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3132 gene, herein designated VGAM GENE, on one or more VGAM3132 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43816] It is yet further appreciated that a function of VGAM3132 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3132 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6. Spe-

cific functions, and accordingly utilities, of VGAM3132 correlate with, and may be deduced from, the identity of the host target genes which VGAM3132 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43817] Nucleotide sequences of the VGAM3132 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3132 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3132 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3132 are further described hereinbelow with reference to Table 1.

[43818] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3132 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43819] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3133 (VGAM3133) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[43820] VGAM3133 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3133 was detected is described hereinabove with reference to Figs. 2–8.

[43821] VGAM3133 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3133 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43822] VGAM3133 gene, herein designated VGAM GENE, encodes a VGAM3133 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3133 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3133 precursor RNA is designated SEQ ID:71130, and is provided hereinbelow with reference to the sequence listing part.

[43823] VGAM3133 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3133 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43824] An enzyme complex designated DICER COMPLEX, dices the VGAM3133 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3133 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3133 RNA is designated SEQ ID:71131, and is provided hereinbelow with reference to the sequence listing part.

[43825] VGAM3133 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3133 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3133 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43826] VGAM3133 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3133 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3133 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3133 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3133 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43827] The complementary binding of VGAM3133 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3133 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3133 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3133 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43828] It is appreciated that VGAM3133 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3133 host target genes. The mRNA of each one of this plurality of VGAM3133 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3133 RNA, herein designated VGAM RNA, and which when bound by VGAM3133 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3133 host target proteins.

[43829] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3133 gene, herein designated VGAM GENE, on one or more VGAM3133 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43830] It is yet further appreciated that a function of VGAM3133 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3133 include diagnosis, prevention and treatment of viral infection by Melanoplus sanguinipes entomopoxvirus. Specific functions, and accordingly utilities,

of VGAM3133 correlate with, and may be deduced from, the identity of the host target genes which VGAM3133 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43831] Nucleotide sequences of the VGAM3133 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3133 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3133 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3133 are further described hereinbelow with reference to Table 1.

[43832] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3133 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43833] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3134 (VGAM3134) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[43834] VGAM3134 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3134 was detected is described hereinabove with reference to Figs. 2-8.

[43835] VGAM3134 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3134 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43836] VGAM3134 gene, herein designated VGAM GENE, encodes a VGAM3134 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3134 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3134 precursor RNA is designated SEQ ID:71137, and is provided hereinbelow with reference to the sequence listing part.

[43837] VGAM3134 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3134 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43838] An enzyme complex designated DICER COMPLEX, dices the VGAM3134 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3134 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3134 RNA is designated SEQ ID:71138, and is provided hereinbelow with reference to the sequence listing part.

[43839] VGAM3134 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3134 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3134 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43840] VGAM3134 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3134 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3134 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3134 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3134 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43841] The complementary binding of VGAM3134 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3134 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3134 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3134 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43842] It is appreciated that VGAM3134 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3134 host target genes. The mRNA of each one of this plurality of VGAM3134 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3134 RNA, herein designated VGAM RNA, and which when bound by VGAM3134 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3134 host target proteins.

[43843] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3134 gene, herein designated VGAM GENE, on one or more VGAM3134 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43844] It is yet further appreciated that a function of VGAM3134 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3134 include diagnosis, prevention and treatment of viral infection by *Melanoplus sanguinipes* entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3134 correlate with, and may be deduced from, the identity of the host target genes which VGAM3134 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43845] Nucleotide sequences of the VGAM3134 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3134 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3134 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3134 are further described hereinbelow with reference to Table 1.

[43846] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3134 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43847] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3135 (VGAM3135) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43848] VGAM3135 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3135 was detected is described hereinabove with reference to Figs. 2-8.

[43849] VGAM3135 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3135 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43850] VGAM3135 gene, herein designated VGAM GENE, encodes

a VGAM3135 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3135 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3135 precursor RNA is designated SEQ ID:71142, and is provided hereinbelow with reference to the sequence listing part.

[43851] VGAM3135 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3135 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43852] An enzyme complex designated DICER COMPLEX, dices the VGAM3135 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3135 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3135 RNA is designated SEQ ID:71143, and is provided hereinbelow with reference to the sequence listing part.

[43853] VGAM3135 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3135 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3135 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43854] VGAM3135 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3135 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3135 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3135 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3135 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43855] The complementary binding of VGAM3135 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3135 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3135 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3135 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[43856] It is appreciated that VGAM3135 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3135 host target genes. The mRNA of each one of this plurality of VGAM3135 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3135 RNA, herein designated VGAM RNA, and which when bound by VGAM3135 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3135 host target proteins.

[43857] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3135 gene, herein designated VGAM GENE, on one or more VGAM3135 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43858] It is yet further appreciated that a function of VGAM3135 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3135 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3135 correlate with, and may be deduced from, the identity of the host target genes which VGAM3135 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43859] Nucleotide sequences of the VGAM3135 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3135 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3135 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3135 are further described hereinbelow with reference to Table 1.

[43860] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3135 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43861] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3136 (VGAM3136) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43862] VGAM3136 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3136 was detected is described hereinabove with reference to Figs. 2-8.

[43863] VGAM3136 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3136 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43864] VGAM3136 gene, herein designated VGAM GENE, encodes a VGAM3136 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3136 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3136 precursor RNA is designated SEQ ID:71188, and is provided hereinbelow with reference to the sequence listing part.

[43865] VGAM3136 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3136 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43866] An enzyme complex designated DICER COMPLEX, dices the VGAM3136 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3136 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3136 RNA is designated SEQ ID:71189, and is provided hereinbelow with reference to the sequence listing part.

[43867] VGAM3136 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3136 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3136 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43868] VGAM3136 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3136 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3136 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3136 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3136 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43869] The complementary binding of VGAM3136 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3136 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3136 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3136 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43870] It is appreciated that VGAM3136 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3136 host target genes. The mRNA of each one of this plurality of VGAM3136 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3136 RNA, herein designated VGAM RNA, and which when bound by VGAM3136 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3136 host target proteins.

[43871] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3136 gene, herein designated VGAM GENE, on one or more VGAM3136 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43872] It is yet further appreciated that a function of VGAM3136 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3136 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3136 correlate with, and may be deduced from, the identity of the host target genes which VGAM3136 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43873] Nucleotide sequences of the VGAM3136 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3136 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3136 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3136 are further described hereinbelow with reference to Table 1.

[43874] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3136 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43875] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3137 (VGAM3137) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43876] VGAM3137 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3137 was detected is described hereinabove with reference to Figs. 2-8.

[43877] VGAM3137 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Caprine arthritis-encephalitis virus. VGAM3137 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43878] VGAM3137 gene, herein designated VGAM GENE, encodes a VGAM3137 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3137 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3137 precursor RNA is designated SEQ ID:71198, and is provided hereinbelow with reference to the sequence listing part.

[43879] VGAM3137 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3137 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43880] An enzyme complex designated DICER COMPLEX, dices the VGAM3137 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3137 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3137 RNA is designated SEQ ID:71199, and is provided hereinbelow with reference to the sequence listing part.

[43881] VGAM3137 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3137 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3137 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43882] VGAM3137 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3137 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3137 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3137 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3137 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43883] The complementary binding of VGAM3137 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3137 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3137 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3137 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43884] It is appreciated that VGAM3137 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3137 host target genes. The mRNA of each one of this plurality of VGAM3137 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3137 RNA, herein designated VGAM RNA, and which when bound by VGAM3137 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3137 host target proteins.

[43885] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3137 gene, herein designated VGAM GENE, on one or more VGAM3137 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43886] It is yet further appreciated that a function of VGAM3137 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3137 include diagnosis, prevention and treatment of viral infection by Caprine arthritis–encephalitis virus. Specific functions, and accordingly utilities, of VGAM3137 correlate with, and may be deduced from, the identity of the host target genes which VGAM3137 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43887] Nucleotide sequences of the VGAM3137 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3137 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3137 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3137 are further described hereinbelow with reference to Table 1.

[43888] Nucleotide sequences of host target binding sites, such as BINDING SITE–I, BINDING SITE–II and BINDING SITE–III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3137 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43889] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3138 (VGAM3138) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43890] VGAM3138 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3138 was detected is described hereinabove with reference to Figs. 2–8.

[43891] VGAM3138 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine arteritis virus. VGAM3138 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43892] VGAM3138 gene, herein designated VGAM GENE, encodes a VGAM3138 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3138 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3138 precursor RNA is designated SEQ ID:71216, and is provided hereinbelow with reference to the sequence listing part.

[43893] VGAM3138 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3138 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43894] An enzyme complex designated DICER COMPLEX, dices the VGAM3138 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3138 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3138 RNA is designated SEQ ID:71217, and is provided hereinbelow with reference to the sequence listing part.

[43895] VGAM3138 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3138 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3138 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43896] VGAM3138 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3138 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3138 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3138 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3138 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43897] The complementary binding of VGAM3138 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3138 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3138 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3138 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43898] It is appreciated that VGAM3138 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3138 host target genes. The mRNA of each one of this plurality of VGAM3138 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3138 RNA, herein designated VGAM RNA, and which when bound by VGAM3138 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3138 host target proteins.

[43899] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3138 gene, herein designated VGAM GENE, on one or more VGAM3138 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [43900] It is yet further appreciated that a function of VGAM3138 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3138 include diagnosis, prevention and treatment of viral infection by Equine arteritis virus. Specific functions, and accordingly utilities, of VGAM3138 correlate with, and may be deduced from, the identity of the host target genes which VGAM3138 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [43901] Nucleotide sequences of the VGAM3138 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3138 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3138 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3138 are further described hereinbelow with reference to Table 1.
- [43902] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3138 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43903] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3139 (VGAM3139) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43904] VGAM3139 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3139 was detected is described hereinabove with reference to Figs. 2-8.

[43905] VGAM3139 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine immunodeficiency virus. VGAM3139 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43906] VGAM3139 gene, herein designated VGAM GENE, encodes a VGAM3139 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3139 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3139 precursor RNA is designated SEQ ID:71230, and is provided hereinbelow with reference to the sequence listing part.

[43907] VGAM3139 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3139 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43908] An enzyme complex designated DICER COMPLEX, dices the VGAM3139 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3139 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3139 RNA is designated SEQ ID:71231, and is provided hereinbelow with reference to the sequence listing part.

[43909] VGAM3139 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3139 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3139 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43910] VGAM3139 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3139 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3139 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3139 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3139 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43911] The complementary binding of VGAM3139 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3139 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3139 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3139 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43912] It is appreciated that VGAM3139 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3139 host target genes. The mRNA of

each one of this plurality of VGAM3139 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3139 RNA, herein designated VGAM RNA, and which when bound by VGAM3139 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3139 host target proteins.

[43913] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3139 gene, herein designated VGAM GENE, on one or more VGAM3139 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[43914] It is yet further appreciated that a function of VGAM3139 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3139 include diagnosis, prevention and treatment of viral infection by Bovine immunodeficiency virus. Specific functions, and accordingly utilities, of VGAM3139 correlate with, and may be deduced from, the identity of the host target genes which VGAM3139 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43915] Nucleotide sequences of the VGAM3139 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3139 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3139 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3139 are further described hereinbelow with reference to Table 1.

[43916] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3139 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[43917] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3140 (VGAM3140) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43918] VGAM3140 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3140 was detected is described hereinabove with reference to Figs. 2–8.

[43919] VGAM3140 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus. VGAM3140 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43920] VGAM3140 gene, herein designated VGAM GENE, encodes a VGAM3140 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3140 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3140 precursor RNA is designated SEQ ID:71237, and is provided hereinbelow with reference to the sequence listing part.

[43921] VGAM3140 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3140 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43922] An enzyme complex designated DICER COMPLEX, dices the VGAM3140 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3140 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3140 RNA is designated SEQ ID:31651,

and is provided hereinbelow with reference to the sequence listing part.

[43923] VGAM3140 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3140 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3140 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43924] VGAM3140 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3140 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3140 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3140 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3140 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43925] The complementary binding of VGAM3140 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3140 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3140 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3140 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43926] It is appreciated that VGAM3140 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3140 host target genes. The mRNA of each one of this plurality of VGAM3140 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3140 RNA, herein designated VGAM RNA, and which when bound by VGAM3140 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3140 host target proteins.

[43927] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3140 gene, herein designated VGAM GENE, on one or more VGAM3140 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43928] It is yet further appreciated that a function of VGAM3140 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3140 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3140 correlate with, and may be deduced from, the identity of the host target genes which VGAM3140 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43929] Nucleotide sequences of the VGAM3140 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3140 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3140 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3140 are further described hereinbelow with reference to Table 1.

[43930] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3140 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43931] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3141 (VGAM3141) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43932] VGAM3141 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3141 was detected is described hereinabove with reference to Figs. 2–8.

[43933] VGAM3141 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Transmissible gastroenteritis virus. VGAM3141 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43934] VGAM3141 gene, herein designated VGAM GENE, encodes a VGAM3141 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3141 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3141 precu-

sor RNA is designated SEQ ID:71238, and is provided hereinbelow with reference to the sequence listing part.

[43935] VGAM3141 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3141 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43936] An enzyme complex designated DICER COMPLEX, dices the VGAM3141 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3141 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3141 RNA is designated SEQ ID:71239, and is provided hereinbelow with reference to the se-

quence listing part.

[43937] VGAM3141 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3141 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3141 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43938] VGAM3141 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3141 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3141 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3141 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3141 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43939] The complementary binding of VGAM3141 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3141 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3141 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3141 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43940] It is appreciated that VGAM3141 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3141 host target genes. The mRNA of each one of this plurality of VGAM3141 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3141 RNA, herein designated VGAM RNA, and which when bound by VGAM3141 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3141 host target proteins.

[43941] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3141 gene, herein designated VGAM GENE, on one or more VGAM3141 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43942] It is yet further appreciated that a function of VGAM3141

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3141 include diagnosis, prevention and treatment of viral infection by Transmissible gastroenteritis virus. Specific functions, and accordingly utilities, of VGAM3141 correlate with, and may be deduced from, the identity of the host target genes which VGAM3141 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43943] Nucleotide sequences of the VGAM3141 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3141 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3141 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3141 are further described hereinbelow with reference to Table 1.

[43944] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3141 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43945] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3142 (VGAM3142) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43946] VGAM3142 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3142 was detected is described hereinabove with reference to Figs. 2–8.

[43947] VGAM3142 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Hepatitis GB virus C. VGAM3142 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43948] VGAM3142 gene, herein designated VGAM GENE, encodes a VGAM3142 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3142 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3142 precursor RNA is designated SEQ ID:71249, and is provided

hereinbelow with reference to the sequence listing part.

[43949] VGAM3142 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3142 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43950] An enzyme complex designated DICER COMPLEX, dices the VGAM3142 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3142 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3142 RNA is designated SEQ ID:71250, and is provided hereinbelow with reference to the sequence listing part.

[43951] VGAM3142 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3142 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3142 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43952] VGAM3142 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3142 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3142 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3142 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3142 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43953] The complementary binding of VGAM3142 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3142 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3142 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3142 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43954] It is appreciated that VGAM3142 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3142 host target genes. The mRNA of each one of this plurality of VGAM3142 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3142 RNA, herein designated VGAM RNA, and which when bound by VGAM3142 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3142 host target proteins.

[43955] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3142 gene, herein designated VGAM GENE, on one or more VGAM3142 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43956] It is yet further appreciated that a function of VGAM3142 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3142 include diagnosis, prevention and treatment of viral infection by Hepatitis GB virus C. Specific functions, and accordingly utilities, of VGAM3142 correlate with, and may be deduced from, the identity of the host target genes which VGAM3142 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43957] Nucleotide sequences of the VGAM3142 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3142 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3142 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3142 are further described hereinbelow with reference to Table 1.

[43958] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3142 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43959] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3143 (VGAM3143) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43960] VGAM3143 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3143 was detected is described hereinabove with reference to Figs. 2–8.

[43961] VGAM3143 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3143 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43962] VGAM3143 gene, herein designated VGAM GENE, encodes a VGAM3143 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3143 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3143 precursor RNA is designated SEQ ID:71263, and is provided hereinbelow with reference to the sequence listing part.

[43963] VGAM3143 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3143 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43964] An enzyme complex designated DICER COMPLEX, dices the VGAM3143 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3143 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3143 RNA is designated SEQ ID:71264, and is provided hereinbelow with reference to the sequence listing part.

[43965] VGAM3143 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3143 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3143 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43966] VGAM3143 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3143 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3143 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3143 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3143 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43967] The complementary binding of VGAM3143 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3143 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3143 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3143 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43968] It is appreciated that VGAM3143 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3143 host target genes. The mRNA of each one of this plurality of VGAM3143 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3143 RNA, herein designated VGAM

RNA, and which when bound by VGAM3143 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3143 host target proteins.

[43969] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3143 gene, herein designated VGAM GENE, on one or more VGAM3143 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43970] It is yet further appreciated that a function of VGAM3143 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3143 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3143 correlate with, and may be deduced from, the identity of the host target genes which VGAM3143 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43971] Nucleotide sequences of the VGAM3143 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3143 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3143 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3143 are further described hereinbelow with reference to Table 1.

[43972] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3143 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43973] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3144 (VGAM3144) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43974] VGAM3144 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3144 was detected is described hereinabove with reference to Figs. 2-8.

[43975] VGAM3144 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3144 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43976] VGAM3144 gene, herein designated VGAM GENE, encodes a VGAM3144 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3144 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3144 precursor RNA is designated SEQ ID:71286, and is provided hereinbelow with reference to the sequence listing part.

[43977] VGAM3144 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3144 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43978] An enzyme complex designated DICER COMPLEX, dices the VGAM3144 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3144 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3144 RNA is designated SEQ ID:71287, and is provided hereinbelow with reference to the sequence listing part.

[43979] VGAM3144 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3144 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3144 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43980] VGAM3144 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3144 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3144 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3144 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3144 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43981] The complementary binding of VGAM3144 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3144 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3144 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3144 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43982] It is appreciated that VGAM3144 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3144 host target genes. The mRNA of each one of this plurality of VGAM3144 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3144 RNA, herein designated VGAM RNA, and which when bound by VGAM3144 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3144 host target proteins.

[43983] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3144 gene, herein designated VGAM GENE, on one or more VGAM3144 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43984] It is yet further appreciated that a function of VGAM3144 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3144 include diagnosis, prevention and

treatment of viral infection by *Paramecium bursaria*

Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3144 correlate with, and may be deduced from, the identity of the host target genes which VGAM3144 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43985] Nucleotide sequences of the VGAM3144 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3144 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3144 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3144 are further described hereinbelow with reference to Table 1.

[43986] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3144 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[43987] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3145 (VGAM3145) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[43988] VGAM3145 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3145 was detected is described hereinabove with reference to Figs. 2–8.

[43989] VGAM3145 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3145 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[43990] VGAM3145 gene, herein designated VGAM GENE, encodes a VGAM3145 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3145 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3145 precursor RNA is designated SEQ ID:71292, and is provided hereinbelow with reference to the sequence listing part.

[43991] VGAM3145 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3145 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[43992] An enzyme complex designated DICER COMPLEX, dices the VGAM3145 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3145 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3145 RNA is designated SEQ ID:71293, and is provided hereinbelow with reference to the sequence listing part.

[43993] VGAM3145 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3145 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3145 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[43994] VGAM3145 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3145 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3145 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3145 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3145 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[43995] The complementary binding of VGAM3145 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3145 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3145 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3145 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[43996] It is appreciated that VGAM3145 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3145 host target genes. The mRNA of each one of this plurality of VGAM3145 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3145 RNA, herein designated VGAM RNA, and which when bound by VGAM3145 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3145 host target proteins.

[43997] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3145 gene, herein designated VGAM GENE, on one or more VGAM3145 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[43998] It is yet further appreciated that a function of VGAM3145 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3145 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Spe-

cific functions, and accordingly utilities, of VGAM3145 correlate with, and may be deduced from, the identity of the host target genes which VGAM3145 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[43999] Nucleotide sequences of the VGAM3145 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3145 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3145 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3145 are further described hereinbelow with reference to Table 1.

[44000] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3145 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44001] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3146 (VGAM3146) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[44002] VGAM3146 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3146 was detected is described hereinabove with reference to Figs. 2–8.

[44003] VGAM3146 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 22. VGAM3146 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44004] VGAM3146 gene, herein designated VGAM GENE, encodes a VGAM3146 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3146 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3146 precursor RNA is designated SEQ ID:71425, and is provided hereinbelow with reference to the sequence listing part.

[44005] VGAM3146 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3146 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44006] An enzyme complex designated DICER COMPLEX, dices the VGAM3146 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3146 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3146 RNA is designated SEQ ID:71426, and is provided hereinbelow with reference to the sequence listing part.

[44007] VGAM3146 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3146 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3146 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44008] VGAM3146 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3146 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3146 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3146 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3146 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44009] The complementary binding of VGAM3146 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3146 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3146 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3146 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44010] It is appreciated that VGAM3146 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3146 host target genes. The mRNA of each one of this plurality of VGAM3146 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3146 RNA, herein designated VGAM RNA, and which when bound by VGAM3146 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3146 host target proteins.

[44011] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3146 gene, herein designated VGAM GENE, on one or more VGAM3146 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44012] It is yet further appreciated that a function of VGAM3146 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3146 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 22. Specific functions, and accordingly utilities, of

VGAM3146 correlate with, and may be deduced from, the identity of the host target genes which VGAM3146 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44013] Nucleotide sequences of the VGAM3146 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3146 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3146 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3146 are further described hereinbelow with reference to Table 1.

[44014] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3146 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44015] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3147 (VGAM3147) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[44016] VGAM3147 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3147 was detected is described hereinabove with reference to Figs. 2–8.

[44017] VGAM3147 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3147 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44018] VGAM3147 gene, herein designated VGAM GENE, encodes a VGAM3147 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3147 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3147 precursor RNA is designated SEQ ID:71432, and is provided hereinbelow with reference to the sequence listing part.

[44019] VGAM3147 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3147 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44020] An enzyme complex designated DICER COMPLEX, dices the VGAM3147 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3147 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3147 RNA is designated SEQ ID:71433, and is provided hereinbelow with reference to the sequence listing part.

[44021] VGAM3147 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3147 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3147 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44022] VGAM3147 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3147 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3147 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3147 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3147 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44023] The complementary binding of VGAM3147 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3147 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3147 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3147 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44024] It is appreciated that VGAM3147 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3147 host target genes. The mRNA of each one of this plurality of VGAM3147 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3147 RNA, herein designated VGAM RNA, and which when bound by VGAM3147 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3147 host target proteins.

[44025] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3147 gene, herein designated VGAM GENE, on one or more VGAM3147 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44026] It is yet further appreciated that a function of VGAM3147 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3147 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3147 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3147 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44027] Nucleotide sequences of the VGAM3147 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3147 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3147 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3147 are further described hereinbelow with reference to Table 1.

[44028] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3147 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44029] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3148 (VGAM3148) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44030] VGAM3148 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3148 was detected is described hereinabove with reference to Figs. 2–8.

[44031] VGAM3148 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus. VGAM3148 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44032] VGAM3148 gene, herein designated VGAM GENE, encodes a VGAM3148 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3148 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3148 precursor RNA is designated SEQ ID:71489, and is provided hereinbelow with reference to the sequence listing part.

[44033] VGAM3148 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3148 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44034] An enzyme complex designated DICER COMPLEX, dices the VGAM3148 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3148 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3148 RNA is designated SEQ ID:71490, and is provided hereinbelow with reference to the sequence listing part.

[44035] VGAM3148 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3148 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3148 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44036] VGAM3148 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3148 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3148 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3148 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3148 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44037] The complementary binding of VGAM3148 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3148 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3148 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3148 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44038] It is appreciated that VGAM3148 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3148 host target genes. The mRNA of each one of this plurality of VGAM3148 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3148 RNA, herein designated VGAM RNA, and which when bound by VGAM3148 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3148 host target proteins.

[44039] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3148 gene, herein designated VGAM GENE, on one or more VGAM3148 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44040] It is yet further appreciated that a function of VGAM3148 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3148 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3148 correlate with, and may be deduced from, the identity of the host target genes which VGAM3148 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[44041] Nucleotide sequences of the VGAM3148 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3148 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3148 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3148 are further described hereinbelow with reference to Table 1.

[44042] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3148 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44043] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3149 (VGAM3149) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44044] VGAM3149 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3149 was detected is described hereinabove with reference to Figs. 2–8.

[44045] VGAM3149 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 24. VGAM3149 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44046] VGAM3149 gene, herein designated VGAM GENE, encodes a VGAM3149 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3149 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3149 precursor RNA is designated SEQ ID:71507, and is provided hereinbelow with reference to the sequence listing part.

[44047] VGAM3149 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3149 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44048] An enzyme complex designated DICER COMPLEX, dices the VGAM3149 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3149 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3149 RNA is designated SEQ ID:71508, and is provided hereinbelow with reference to the sequence listing part.

[44049] VGAM3149 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3149 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3149 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44050] VGAM3149 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3149 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3149 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3149 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3149 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[44051] The complementary binding of VGAM3149 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3149 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3149 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3149 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44052] It is appreciated that VGAM3149 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3149 host target genes. The mRNA of each one of this plurality of VGAM3149 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3149 RNA, herein designated VGAM RNA, and which when bound by VGAM3149 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3149 host target proteins.

[44053] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3149 gene, herein designated VGAM GENE, on one or more VGAM3149 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44054] It is yet further appreciated that a function of VGAM3149 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3149 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 24. Specific functions, and accordingly utilities, of VGAM3149 correlate with, and may be deduced from, the identity of the host target genes which VGAM3149 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[44055] Nucleotide sequences of the VGAM3149 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3149 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3149 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3149 are further described hereinbelow with reference to Table 1.

[44056] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3149 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44057] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3150 (VGAM3150) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44058] VGAM3150 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3150 was detected is described hereinabove with reference to Figs. 2–8.

[44059] VGAM3150 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 37. VGAM3150 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44060] VGAM3150 gene, herein designated VGAM GENE, encodes a VGAM3150 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3150 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3150 precursor RNA is designated SEQ ID:71539, and is provided hereinbelow with reference to the sequence listing part.

[44061] VGAM3150 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3150 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44062] An enzyme complex designated DICER COMPLEX, dices the VGAM3150 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3150 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3150 RNA is designated SEQ ID:71540, and is provided hereinbelow with reference to the sequence listing part.

[44063] VGAM3150 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3150 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3150 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[44064] VGAM3150 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3150 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3150 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3150 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3150 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44065] The complementary binding of VGAM3150 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3150 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3150 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3150 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44066] It is appreciated that VGAM3150 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3150 host target genes. The mRNA of each one of this plurality of VGAM3150 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3150 RNA, herein designated VGAM RNA, and which when bound by VGAM3150 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3150 host target proteins.

[44067] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3150 gene, herein designated VGAM GENE, on one

or more VGAM3150 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44068] It is yet further appreciated that a function of VGAM3150 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3150 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 37. Specific functions, and accordingly utilities, of VGAM3150 correlate with, and may be deduced from, the identity of the host target genes which VGAM3150 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44069] Nucleotide sequences of the VGAM3150 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3150 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3150 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3150 are further described hereinbelow with reference to Table 1.

[44070] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3150 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44071] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3151 (VGAM3151) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44072] VGAM3151 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3151 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[44073] VGAM3151 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ictalurid herpesvirus 1. VGAM3151 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44074] VGAM3151 gene, herein designated VGAM GENE, encodes a VGAM3151 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3151 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3151 precursor RNA is designated SEQ ID:71549, and is provided hereinbelow with reference to the sequence listing part.

[44075] VGAM3151 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3151 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44076] An enzyme complex designated DICER COMPLEX, dices the VGAM3151 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3151 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3151 RNA is designated SEQ ID:71550, and is provided hereinbelow with reference to the sequence listing part.

[44077] VGAM3151 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3151 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3151 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44078] VGAM3151 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3151 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3151 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3151 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3151 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44079] The complementary binding of VGAM3151 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3151 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3151 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3151 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44080] It is appreciated that VGAM3151 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3151 host target genes. The mRNA of each one of this plurality of VGAM3151 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3151 RNA, herein designated VGAM RNA, and which when bound by VGAM3151 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3151 host target proteins.

[44081] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3151 gene, herein designated VGAM GENE, on one or more VGAM3151 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44082] It is yet further appreciated that a function of VGAM3151 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3151 include diagnosis, prevention and treatment of viral infection by Ictalurid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3151 correlate with, and may be deduced from, the identity of the host target genes which VGAM3151 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44083] Nucleotide sequences of the VGAM3151 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3151 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3151 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3151 are further described hereinbelow with reference to Table 1.

[44084] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3151 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44085] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3152 (VGAM3152) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44086] VGAM3152 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3152 was detected is described hereinabove with reference to Figs. 2-8.

[44087] VGAM3152 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3152 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44088] VGAM3152 gene, herein designated VGAM GENE, encodes a VGAM3152 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3152 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3152 precursor RNA is designated SEQ ID:71552, and is provided hereinbelow with reference to the sequence listing part.

[44089] VGAM3152 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3152 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[44090] An enzyme complex designated DICER COMPLEX, dices the VGAM3152 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3152 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3152 RNA is designated SEQ ID:71553, and is provided hereinbelow with reference to the sequence listing part.

[44091] VGAM3152 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3152 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3152 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44092] VGAM3152 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3152 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3152 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3152 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3152 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44093] The complementary binding of VGAM3152 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3152 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3152 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3152 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44094] It is appreciated that VGAM3152 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3152 host target genes. The mRNA of each one of this plurality of VGAM3152 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3152 RNA, herein designated VGAM RNA, and which when bound by VGAM3152 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3152 host target proteins.

[44095] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3152 gene, herein designated VGAM GENE, on one or more VGAM3152 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44096] It is yet further appreciated that a function of VGAM3152 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3152 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3152 correlate with, and may be deduced from, the identity of the host target genes which VGAM3152 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44097] Nucleotide sequences of the VGAM3152 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3152 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3152 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3152 are further described hereinbelow with reference to Table 1.

[44098] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3152 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44099] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3153 (VGAM3153) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44100] VGAM3153 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3153 was detected is described hereinabove with reference to Figs. 2-8.

[44101] VGAM3153 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Gallid herpesvirus 2. VGAM3153 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44102] VGAM3153 gene, herein designated VGAM GENE, encodes a VGAM3153 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3153 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3153 precursor RNA is designated SEQ ID:71566, and is provided hereinbelow with reference to the sequence listing part.

[44103] VGAM3153 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3153 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44104] An enzyme complex designated DICER COMPLEX, dices the VGAM3153 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3153 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3153 RNA is designated SEQ ID:71567, and is provided hereinbelow with reference to the sequence listing part.

[44105] VGAM3153 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3153 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3153 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44106] VGAM3153 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3153 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3153 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3153 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3153 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44107] The complementary binding of VGAM3153 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3153 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3153 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3153 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44108] It is appreciated that VGAM3153 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3153 host target genes. The mRNA of each one of this plurality of VGAM3153 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3153 RNA, herein designated VGAM RNA, and which when bound by VGAM3153 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3153 host target proteins.

[44109] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3153 gene, herein designated VGAM GENE, on one or more VGAM3153 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44110] It is yet further appreciated that a function of VGAM3153 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3153 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3153 correlate with, and may be deduced from, the identity of the host target genes which VGAM3153 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44111] Nucleotide sequences of the VGAM3153 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3153 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3153 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3153 are further described hereinbelow with reference to Table 1.

[44112] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3153 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44113] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3154 (VGAM3154) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44114] VGAM3154 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3154 was detected is described hereinabove with reference to Figs. 2-8.

[44115] VGAM3154 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2.

VGAM3154 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44116] VGAM3154 gene, herein designated VGAM GENE, encodes a VGAM3154 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3154 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3154 precursor RNA is designated SEQ ID:71576, and is provided hereinbelow with reference to the sequence listing part.

[44117] VGAM3154 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3154 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44118] An enzyme complex designated DICER COMPLEX, dices

the VGAM3154 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3154 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3154 RNA is designated SEQ ID:71577, and is provided hereinbelow with reference to the sequence listing part.

[44119] VGAM3154 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3154 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3154 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44120] VGAM3154 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3154 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3154 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3154 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3154 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44121] The complementary binding of VGAM3154 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3154 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3154 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3154 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44122] It is appreciated that VGAM3154 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3154 host target genes. The mRNA of each one of this plurality of VGAM3154 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3154 RNA, herein designated VGAM RNA, and which when bound by VGAM3154 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3154 host target proteins.

[44123] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3154 gene, herein designated VGAM GENE, on one or more VGAM3154 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44124] It is yet further appreciated that a function of VGAM3154 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3154 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3154 correlate with, and may be deduced from, the identity of the host target genes which VGAM3154 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44125] Nucleotide sequences of the VGAM3154 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3154 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3154 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3154 are further described hereinbelow with reference to Table 1.

[44126] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3154 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44127] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3155 (VGAM3155) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44128] VGAM3155 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3155 was detected is described hereinabove with reference to Figs. 2-8.

[44129] VGAM3155 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3155 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44130] VGAM3155 gene, herein designated VGAM GENE, encodes a VGAM3155 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3155 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3155 precursor RNA is designated SEQ ID:71586, and is provided hereinbelow with reference to the sequence listing part.

[44131] VGAM3155 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3155 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44132] An enzyme complex designated DICER COMPLEX, dices the VGAM3155 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3155 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3155 RNA is designated SEQ ID:71587, and is provided hereinbelow with reference to the sequence listing part.

[44133] VGAM3155 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3155 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3155 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44134] VGAM3155 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3155 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3155 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3155 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3155 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44135] The complementary binding of VGAM3155 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3155 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3155

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3155 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44136] It is appreciated that VGAM3155 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3155 host target genes. The mRNA of each one of this plurality of VGAM3155 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3155 RNA, herein designated VGAM RNA, and which when bound by VGAM3155 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3155 host target proteins.

[44137] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3155 gene, herein designated VGAM GENE, on one or more VGAM3155 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44138] It is yet further appreciated that a function of VGAM3155 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3155 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3155 correlate with, and may be deduced from, the identity of the host target genes which VGAM3155 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44139] Nucleotide sequences of the VGAM3155 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3155 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3155 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3155 are further described hereinbelow with reference to Table 1.

[44140] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3155 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44141] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3156 (VGAM3156) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44142] VGAM3156 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3156 was detected is described hereinabove with reference to Figs. 2-8.

[44143] VGAM3156 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia paramyxovirus. VGAM3156 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[44144] VGAM3156 gene, herein designated VGAM GENE, encodes a VGAM3156 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3156 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3156 precursor RNA is designated SEQ ID:71590, and is provided hereinbelow with reference to the sequence listing part.

[44145] VGAM3156 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3156 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44146] An enzyme complex designated DICER COMPLEX, dices the VGAM3156 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3156 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3156 RNA is designated SEQ ID:71591, and is provided hereinbelow with reference to the sequence listing part.

[44147] VGAM3156 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3156 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3156 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44148] VGAM3156 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3156 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3156 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3156 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3156 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44149] The complementary binding of VGAM3156 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3156 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3156 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3156 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44150] It is appreciated that VGAM3156 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3156 host target genes. The mRNA of each one of this plurality of VGAM3156 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3156 RNA, herein designated VGAM RNA, and which when bound by VGAM3156 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3156 host target proteins.

[44151] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3156 gene, herein designated VGAM GENE, on one or more VGAM3156 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44152] It is yet further appreciated that a function of VGAM3156 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3156 include diagnosis, prevention and treatment of viral infection by Tupaia paramyxovirus. Specific functions, and accordingly utilities, of VGAM3156 correlate with, and may be deduced from, the identity of the host target genes which VGAM3156 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44153] Nucleotide sequences of the VGAM3156 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3156 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3156 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3156 are further

described hereinbelow with reference to Table 1.

[44154] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3156 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44155] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3157 (VGAM3157) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44156] VGAM3157 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3157 was detected is described hereinabove with reference to Figs. 2-8.

[44157] VGAM3157 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cycas necrotic stunt virus. VGAM3157 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44158] VGAM3157 gene, herein designated VGAM GENE, encodes a VGAM3157 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3157 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3157 precursor RNA is designated SEQ ID:71606, and is provided hereinbelow with reference to the sequence listing part.

[44159] VGAM3157 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3157 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44160] An enzyme complex designated DICER COMPLEX, dices the VGAM3157 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3157 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3157 RNA is designated SEQ ID:71607, and is provided hereinbelow with reference to the sequence listing part.

[44161] VGAM3157 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3157 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3157 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44162] VGAM3157 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3157 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3157 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3157 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3157 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44163] The complementary binding of VGAM3157 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3157 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3157 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3157 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44164] It is appreciated that VGAM3157 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3157 host target genes. The mRNA of each one of this plurality of VGAM3157 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3157 RNA, herein designated VGAM RNA, and which when bound by VGAM3157 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3157 host target proteins.

[44165] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3157 gene, herein designated VGAM GENE, on one or more VGAM3157 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44166] It is yet further appreciated that a function of VGAM3157 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3157 include diagnosis, prevention and treatment of viral infection by Cycas necrotic stunt virus. Specific functions, and accordingly utilities, of VGAM3157 correlate with, and may be deduced from, the identity of the host target genes which VGAM3157 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44167] Nucleotide sequences of the VGAM3157 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3157 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3157 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3157 are further described hereinbelow with reference to Table 1.

[44168] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3157 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44169] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3158 (VGAM3158) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44170] VGAM3158 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3158 was detected is described hereinabove with reference to Figs. 2-8.

[44171] VGAM3158 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Hop latent virus. VGAM3158 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44172] VGAM3158 gene, herein designated VGAM GENE, encodes

a VGAM3158 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3158 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3158 precursor RNA is designated SEQ ID:71619, and is provided hereinbelow with reference to the sequence listing part.

[44173] VGAM3158 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3158 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44174] An enzyme complex designated DICER COMPLEX, dices the VGAM3158 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3158 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3158 RNA is designated SEQ ID:71620, and is provided hereinbelow with reference to the sequence listing part.

[44175] VGAM3158 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3158 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3158 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44176] VGAM3158 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3158 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3158 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3158 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3158 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44177] The complementary binding of VGAM3158 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3158 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3158 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3158 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[44178] It is appreciated that VGAM3158 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3158 host target genes. The mRNA of each one of this plurality of VGAM3158 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3158 RNA, herein designated VGAM RNA, and which when bound by VGAM3158 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3158 host target proteins.

[44179] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3158 gene, herein designated VGAM GENE, on one or more VGAM3158 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44180] It is yet further appreciated that a function of VGAM3158 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3158 include diagnosis, prevention and treatment of viral infection by Hop latent virus. Specific functions, and accordingly utilities, of VGAM3158 correlate with, and may be deduced from, the identity of the host target genes which VGAM3158 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44181] Nucleotide sequences of the VGAM3158 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3158 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3158 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3158 are further described hereinbelow with reference to Table 1.

[44182] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3158 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44183] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3159 (VGAM3159) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44184] VGAM3159 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3159 was detected is described hereinabove with reference to Figs. 2-8.

[44185] VGAM3159 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 6. VGAM3159 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44186] VGAM3159 gene, herein designated VGAM GENE, encodes a VGAM3159 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3159 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3159 precursor RNA is designated SEQ ID:71640, and is provided hereinbelow with reference to the sequence listing part.

[44187] VGAM3159 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3159 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44188] An enzyme complex designated DICER COMPLEX, dices the VGAM3159 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3159 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3159 RNA is designated SEQ ID:71641, and is provided hereinbelow with reference to the sequence listing part.

[44189] VGAM3159 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3159 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3159 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44190] VGAM3159 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3159 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3159 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3159 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3159 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44191] The complementary binding of VGAM3159 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3159 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3159 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3159 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44192] It is appreciated that VGAM3159 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3159 host target genes. The mRNA of each one of this plurality of VGAM3159 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3159 RNA, herein designated VGAM RNA, and which when bound by VGAM3159 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3159 host target proteins.

[44193] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3159 gene, herein designated VGAM GENE, on one or more VGAM3159 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44194] It is yet further appreciated that a function of VGAM3159 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3159 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 6. Specific functions, and accordingly utilities, of VGAM3159 correlate with, and may be deduced from, the identity of the host target genes which VGAM3159 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44195] Nucleotide sequences of the VGAM3159 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3159 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3159 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3159 are further described hereinbelow with reference to Table 1.

[44196] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3159 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44197] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3160 (VGAM3160) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44198] VGAM3160 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3160 was detected is described hereinabove with reference to Figs. 2-8.

[44199] VGAM3160 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rabbit oral papillomavirus. VGAM3160 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44200] VGAM3160 gene, herein designated VGAM GENE, encodes a VGAM3160 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3160 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3160 precursor RNA is designated SEQ ID:71660, and is provided hereinbelow with reference to the sequence listing part.

[44201] VGAM3160 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3160 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44202] An enzyme complex designated DICER COMPLEX, dices the VGAM3160 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3160 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3160 RNA is designated SEQ ID:71661, and is provided hereinbelow with reference to the sequence listing part.

[44203] VGAM3160 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3160 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3160 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44204] VGAM3160 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3160 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3160 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3160 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3160 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44205] The complementary binding of VGAM3160 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3160 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3160 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3160 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44206] It is appreciated that VGAM3160 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3160 host target genes. The mRNA of each one of this plurality of VGAM3160 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3160 RNA, herein designated VGAM RNA, and which when bound by VGAM3160 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3160 host target proteins.

[44207] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3160 gene, herein designated VGAM GENE, on one or more VGAM3160 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44208] It is yet further appreciated that a function of VGAM3160 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3160 include diagnosis, prevention and treatment of viral infection by Rabbit oral papillomavirus. Specific functions, and accordingly utilities, of VGAM3160 correlate with, and may be deduced from, the identity of the host target genes which VGAM3160 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44209] Nucleotide sequences of the VGAM3160 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3160 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3160 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3160 are further described hereinbelow with reference to Table 1.

[44210] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3160 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44211] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3161 (VGAM3161) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44212] VGAM3161 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3161 was detected is described hereinabove with reference to Figs. 2–8.

[44213] VGAM3161 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3161 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44214] VGAM3161 gene, herein designated VGAM GENE, encodes a VGAM3161 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3161 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3161 precursor RNA is designated SEQ ID:71679, and is provided hereinbelow with reference to the sequence listing part.

[44215] VGAM3161 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3161 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44216] An enzyme complex designated DICER COMPLEX, dices the VGAM3161 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3161 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3161 RNA is designated SEQ ID:71680, and is provided hereinbelow with reference to the sequence listing part.

[44217] VGAM3161 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3161 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3161 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44218] VGAM3161 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3161 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3161 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3161 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3161 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44219] The complementary binding of VGAM3161 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3161 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3161 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3161 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44220] It is appreciated that VGAM3161 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3161 host target genes. The mRNA of each one of this plurality of VGAM3161 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3161 RNA, herein designated VGAM RNA, and which when bound by VGAM3161 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3161 host target proteins.

[44221] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3161 gene, herein designated VGAM GENE, on one or more VGAM3161 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [44222] It is yet further appreciated that a function of VGAM3161 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3161 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3161 correlate with, and may be deduced from, the identity of the host target genes which VGAM3161 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [44223] Nucleotide sequences of the VGAM3161 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3161 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3161 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3161 are further described hereinbelow with reference to Table 1.
- [44224] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3161 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44225] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3162 (VGAM3162) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44226] VGAM3162 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3162 was detected is described hereinabove with reference to Figs. 2–8.

[44227] VGAM3162 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cherry virus A. VGAM3162 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44228] VGAM3162 gene, herein designated VGAM GENE, encodes a VGAM3162 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3162 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3162 precursor RNA is designated SEQ ID:71750, and is provided hereinbelow with reference to the sequence listing part.

[44229] VGAM3162 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3162 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44230] An enzyme complex designated DICER COMPLEX, dices the VGAM3162 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3162 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3162 RNA is designated SEQ ID:71751, and is provided hereinbelow with reference to the sequence listing part.

[44231] VGAM3162 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3162 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3162 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44232] VGAM3162 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3162 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3162 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3162 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3162 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44233] The complementary binding of VGAM3162 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3162 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3162 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3162 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44234] It is appreciated that VGAM3162 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3162 host target genes. The mRNA of

each one of this plurality of VGAM3162 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3162 RNA, herein designated VGAM RNA, and which when bound by VGAM3162 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3162 host target proteins.

[44235] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3162 gene, herein designated VGAM GENE, on one or more VGAM3162 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[44236] It is yet further appreciated that a function of VGAM3162 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3162 include diagnosis, prevention and treatment of viral infection by Cherry virus A. Specific functions, and accordingly utilities, of VGAM3162 correlate with, and may be deduced from, the identity of the host target genes which VGAM3162 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44237] Nucleotide sequences of the VGAM3162 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3162 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3162 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3162 are further described hereinbelow with reference to Table 1.

[44238] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3162 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[44239] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3163 (VGAM3163) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44240] VGAM3163 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3163 was detected is described hereinabove with reference to Figs. 2–8.

[44241] VGAM3163 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 7. VGAM3163 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44242] VGAM3163 gene, herein designated VGAM GENE, encodes a VGAM3163 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3163 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3163 precursor RNA is designated SEQ ID:71760, and is provided hereinbelow with reference to the sequence listing part.

[44243] VGAM3163 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3163 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44244] An enzyme complex designated DICER COMPLEX, dices the VGAM3163 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3163 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3163 RNA is designated SEQ ID:71761,

and is provided hereinbelow with reference to the sequence listing part.

[44245] VGAM3163 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3163 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3163 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44246] VGAM3163 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3163 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3163 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3163 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3163 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44247] The complementary binding of VGAM3163 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3163 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3163 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3163 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44248] It is appreciated that VGAM3163 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3163 host target genes. The mRNA of each one of this plurality of VGAM3163 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3163 RNA, herein designated VGAM RNA, and which when bound by VGAM3163 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3163 host target proteins.

[44249] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3163 gene, herein designated VGAM GENE, on one or more VGAM3163 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44250] It is yet further appreciated that a function of VGAM3163 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3163 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3163 correlate with, and may be deduced from, the identity of the host target genes which VGAM3163 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44251] Nucleotide sequences of the VGAM3163 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3163 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3163 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3163 are further described hereinbelow with reference to Table 1.

[44252] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3163 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44253] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3164 (VGAM3164) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44254] VGAM3164 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3164 was detected is described hereinabove with reference to Figs. 2–8.

[44255] VGAM3164 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 7. VGAM3164 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44256] VGAM3164 gene, herein designated VGAM GENE, encodes a VGAM3164 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3164 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3164 precursor

sor RNA is designated SEQ ID:71770, and is provided hereinbelow with reference to the sequence listing part.

[44257] VGAM3164 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3164 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44258] An enzyme complex designated DICER COMPLEX, dices the VGAM3164 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3164 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3164 RNA is designated SEQ ID:71771, and is provided hereinbelow with reference to the se-

quence listing part.

[44259] VGAM3164 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3164 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3164 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44260] VGAM3164 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3164 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3164 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3164 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3164 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44261] The complementary binding of VGAM3164 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3164 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3164 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3164 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44262] It is appreciated that VGAM3164 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3164 host target genes. The mRNA of each one of this plurality of VGAM3164 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3164 RNA, herein designated VGAM RNA, and which when bound by VGAM3164 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3164 host target proteins.

[44263] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3164 gene, herein designated VGAM GENE, on one or more VGAM3164 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44264] It is yet further appreciated that a function of VGAM3164

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3164 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3164 correlate with, and may be deduced from, the identity of the host target genes which VGAM3164 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44265] Nucleotide sequences of the VGAM3164 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3164 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3164 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3164 are further described hereinbelow with reference to Table 1.

[44266] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3164 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44267] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3165 (VGAM3165) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44268] VGAM3165 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3165 was detected is described hereinabove with reference to Figs. 2–8.

[44269] VGAM3165 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Giardia lamblia virus. VGAM3165 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44270] VGAM3165 gene, herein designated VGAM GENE, encodes a VGAM3165 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3165 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3165 precursor RNA is designated SEQ ID:71807, and is provided

hereinbelow with reference to the sequence listing part.

[44271] VGAM3165 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3165 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44272] An enzyme complex designated DICER COMPLEX, dices the VGAM3165 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3165 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3165 RNA is designated SEQ ID:71808, and is provided hereinbelow with reference to the sequence listing part.

[44273] VGAM3165 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3165 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3165 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44274] VGAM3165 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3165 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3165 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3165 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3165 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44275] The complementary binding of VGAM3165 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3165 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3165 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3165 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44276] It is appreciated that VGAM3165 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3165 host target genes. The mRNA of each one of this plurality of VGAM3165 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3165 RNA, herein designated VGAM RNA, and which when bound by VGAM3165 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3165 host target proteins.

[44277] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3165 gene, herein designated VGAM GENE, on one or more VGAM3165 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44278] It is yet further appreciated that a function of VGAM3165 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3165 include diagnosis, prevention and treatment of viral infection by Giardia lamblia virus. Specific functions, and accordingly utilities, of VGAM3165 correlate with, and may be deduced from, the identity of the host target genes which VGAM3165 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44279] Nucleotide sequences of the VGAM3165 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3165 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3165 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3165 are further described hereinbelow with reference to Table 1.

[44280] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3165 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44281] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3166 (VGAM3166) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44282] VGAM3166 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3166 was detected is described hereinabove with reference to Figs. 2–8.

[44283] VGAM3166 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3166 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44284] VGAM3166 gene, herein designated VGAM GENE, encodes a VGAM3166 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3166 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3166 precursor RNA is designated SEQ ID:71827, and is provided hereinbelow with reference to the sequence listing part.

[44285] VGAM3166 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3166 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44286] An enzyme complex designated DICER COMPLEX, dices the VGAM3166 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3166 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3166 RNA is designated SEQ ID:71828, and is provided hereinbelow with reference to the sequence listing part.

[44287] VGAM3166 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3166 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3166 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44288] VGAM3166 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3166 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3166 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3166 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3166 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44289] The complementary binding of VGAM3166 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3166 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3166 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3166 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44290] It is appreciated that VGAM3166 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3166 host target genes. The mRNA of each one of this plurality of VGAM3166 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3166 RNA, herein designated VGAM

RNA, and which when bound by VGAM3166 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3166 host target proteins.

[44291] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3166 gene, herein designated VGAM GENE, on one or more VGAM3166 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44292] It is yet further appreciated that a function of VGAM3166 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3166 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3166 correlate with, and may be deduced from, the identity of the host target genes which VGAM3166 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44293] Nucleotide sequences of the VGAM3166 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3166 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3166 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3166 are further described hereinbelow with reference to Table 1.

[44294] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3166 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44295] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3167 (VGAM3167) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44296] VGAM3167 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3167 was detected is described hereinabove with reference to Figs. 2-8.

[44297] VGAM3167 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3167 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44298] VGAM3167 gene, herein designated VGAM GENE, encodes a VGAM3167 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3167 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3167 precursor RNA is designated SEQ ID:71830, and is provided hereinbelow with reference to the sequence listing part.

[44299] VGAM3167 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3167 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44300] An enzyme complex designated DICER COMPLEX, dices the VGAM3167 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3167 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3167 RNA is designated SEQ ID:71831, and is provided hereinbelow with reference to the sequence listing part.

[44301] VGAM3167 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3167 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3167 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44302] VGAM3167 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3167 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3167 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3167 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3167 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44303] The complementary binding of VGAM3167 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3167 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3167 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3167 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44304] It is appreciated that VGAM3167 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3167 host target genes. The mRNA of each one of this plurality of VGAM3167 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3167 RNA, herein designated VGAM RNA, and which when bound by VGAM3167 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3167 host target proteins.

[44305] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3167 gene, herein designated VGAM GENE, on one or more VGAM3167 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44306] It is yet further appreciated that a function of VGAM3167 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3167 include diagnosis, prevention and

treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3167 correlate with, and may be deduced from, the identity of the host target genes which VGAM3167 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44307] Nucleotide sequences of the VGAM3167 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3167 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3167 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3167 are further described hereinbelow with reference to Table 1.

[44308] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3167 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44309] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3168 (VGAM3168) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44310] VGAM3168 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3168 was detected is described hereinabove with reference to Figs. 2–8.

[44311] VGAM3168 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3168 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44312] VGAM3168 gene, herein designated VGAM GENE, encodes a VGAM3168 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3168 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3168 precursor RNA is designated SEQ ID:71834, and is provided hereinbelow with reference to the sequence listing part.

[44313] VGAM3168 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3168 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44314] An enzyme complex designated DICER COMPLEX, dices the VGAM3168 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3168 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3168 RNA is designated SEQ ID:71835, and is provided hereinbelow with reference to the sequence listing part.

[44315] VGAM3168 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3168 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3168 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44316] VGAM3168 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3168 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3168 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3168 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3168 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44317] The complementary binding of VGAM3168 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3168 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3168 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3168 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44318] It is appreciated that VGAM3168 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3168 host target genes. The mRNA of each one of this plurality of VGAM3168 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3168 RNA, herein designated VGAM RNA, and which when bound by VGAM3168 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3168 host target proteins.

[44319] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3168 gene, herein designated VGAM GENE, on one or more VGAM3168 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44320] It is yet further appreciated that a function of VGAM3168 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3168 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Spe-

cific functions, and accordingly utilities, of VGAM3168 correlate with, and may be deduced from, the identity of the host target genes which VGAM3168 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44321] Nucleotide sequences of the VGAM3168 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3168 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3168 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3168 are further described hereinbelow with reference to Table 1.

[44322] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3168 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44323] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3169 (VGAM3169) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[44324] VGAM3169 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3169 was detected is described hereinabove with reference to Figs. 2–8.

[44325] VGAM3169 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Variola virus. VGAM3169 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44326] VGAM3169 gene, herein designated VGAM GENE, encodes a VGAM3169 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3169 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3169 precursor RNA is designated SEQ ID:71849, and is provided hereinbelow with reference to the sequence listing part.

[44327] VGAM3169 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3169 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44328] An enzyme complex designated DICER COMPLEX, dices the VGAM3169 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3169 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3169 RNA is designated SEQ ID:71850, and is provided hereinbelow with reference to the sequence listing part.

[44329] VGAM3169 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3169 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3169 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44330] VGAM3169 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3169 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3169 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3169 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3169 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44331] The complementary binding of VGAM3169 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3169 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3169 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3169 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44332] It is appreciated that VGAM3169 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3169 host target genes. The mRNA of each one of this plurality of VGAM3169 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3169 RNA, herein designated VGAM RNA, and which when bound by VGAM3169 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3169 host target proteins.

[44333] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3169 gene, herein designated VGAM GENE, on one or more VGAM3169 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44334] It is yet further appreciated that a function of VGAM3169 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3169 include diagnosis, prevention and treatment of viral infection by Variola virus. Specific functions, and accordingly utilities, of VGAM3169 correlate with, and may be deduced from, the identity of the host

target genes which VGAM3169 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44335] Nucleotide sequences of the VGAM3169 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3169 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3169 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3169 are further described hereinbelow with reference to Table 1.

[44336] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3169 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44337] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3170 (VGAM3170) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44338] VGAM3170 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3170 was detected is described hereinabove with reference to Figs. 2–8.

[44339] VGAM3170 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 2. VGAM3170 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44340] VGAM3170 gene, herein designated VGAM GENE, encodes a VGAM3170 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3170 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3170 precursor RNA is designated SEQ ID:71866, and is provided hereinbelow with reference to the sequence listing part.

[44341] VGAM3170 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3170 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44342] An enzyme complex designated DICER COMPLEX, dices the VGAM3170 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3170 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3170 RNA is designated SEQ ID:71867, and is provided hereinbelow with reference to the sequence listing part.

[44343] VGAM3170 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3170 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3170 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44344] VGAM3170 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3170 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3170 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3170 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3170 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44345] The complementary binding of VGAM3170 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3170 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3170 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3170 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44346] It is appreciated that VGAM3170 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3170 host target genes. The mRNA of each one of this plurality of VGAM3170 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3170 RNA, herein designated VGAM RNA, and which when bound by VGAM3170 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3170 host target proteins.

[44347] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3170 gene, herein designated VGAM GENE, on one or more VGAM3170 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44348] It is yet further appreciated that a function of VGAM3170 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3170 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3170 correlate with, and may be deduced from, the identity of the host target genes which VGAM3170 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[44349] Nucleotide sequences of the VGAM3170 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3170 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3170 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3170 are further described hereinbelow with reference to Table 1.

[44350] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3170 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44351] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3171 (VGAM3171) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44352] VGAM3171 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3171 was detected is described hereinabove with reference to Figs. 2–8.

[44353] VGAM3171 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Foxtail mosaic virus. VGAM3171 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44354] VGAM3171 gene, herein designated VGAM GENE, encodes a VGAM3171 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3171 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3171 precursor RNA is designated SEQ ID:71930, and is provided hereinbelow with reference to the sequence listing part.

[44355] VGAM3171 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3171 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44356] An enzyme complex designated DICER COMPLEX, dices the VGAM3171 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3171 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3171 RNA is designated SEQ ID:71931, and is provided hereinbelow with reference to the sequence listing part.

[44357] VGAM3171 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3171 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3171 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44358] VGAM3171 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3171 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3171 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3171 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3171 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[44359] The complementary binding of VGAM3171 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3171 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3171 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3171 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44360] It is appreciated that VGAM3171 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3171 host target genes. The mRNA of each one of this plurality of VGAM3171 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3171 RNA, herein designated VGAM RNA, and which when bound by VGAM3171 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3171 host target proteins.

[44361] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3171 gene, herein designated VGAM GENE, on one or more VGAM3171 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44362] It is yet further appreciated that a function of VGAM3171 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3171 include diagnosis, prevention and treatment of viral infection by Foxtail mosaic virus. Specific functions, and accordingly utilities, of VGAM3171 correlate with, and may be deduced from, the identity of the host target genes which VGAM3171 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[44363] Nucleotide sequences of the VGAM3171 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3171 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3171 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3171 are further described hereinbelow with reference to Table 1.

[44364] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3171 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44365] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3172 (VGAM3172) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44366] VGAM3172 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3172 was detected is described hereinabove with reference to Figs. 2–8.

[44367] VGAM3172 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Foxtail mosaic virus. VGAM3172 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44368] VGAM3172 gene, herein designated VGAM GENE, encodes a VGAM3172 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3172 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3172 precursor RNA is designated SEQ ID:71966, and is provided hereinbelow with reference to the sequence listing part.

[44369] VGAM3172 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3172 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44370] An enzyme complex designated DICER COMPLEX, dices the VGAM3172 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3172 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3172 RNA is designated SEQ ID:71967, and is provided hereinbelow with reference to the sequence listing part.

[44371] VGAM3172 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3172 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3172 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[44372] VGAM3172 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3172 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3172 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3172 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3172 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44373] The complementary binding of VGAM3172 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3172 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3172 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3172 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44374] It is appreciated that VGAM3172 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3172 host target genes. The mRNA of each one of this plurality of VGAM3172 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3172 RNA, herein designated VGAM RNA, and which when bound by VGAM3172 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3172 host target proteins.

[44375] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3172 gene, herein designated VGAM GENE, on one

or more VGAM3172 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44376] It is yet further appreciated that a function of VGAM3172 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3172 include diagnosis, prevention and treatment of viral infection by Foxtail mosaic virus. Specific functions, and accordingly utilities, of VGAM3172 correlate with, and may be deduced from, the identity of the host target genes which VGAM3172 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44377] Nucleotide sequences of the VGAM3172 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3172 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3172 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3172 are further described hereinbelow with reference to Table 1.

[44378] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3172 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44379] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3173 (VGAM3173) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44380] VGAM3173 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3173 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[44381] VGAM3173 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Macaca mulatta rhadinovirus. VGAM3173 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44382] VGAM3173 gene, herein designated VGAM GENE, encodes a VGAM3173 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3173 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3173 precursor RNA is designated SEQ ID:71984, and is provided hereinbelow with reference to the sequence listing part.

[44383] VGAM3173 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3173 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44384] An enzyme complex designated DICER COMPLEX, dices the VGAM3173 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3173 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3173 RNA is designated SEQ ID:71985, and is provided hereinbelow with reference to the sequence listing part.

[44385] VGAM3173 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3173 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3173 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44386] VGAM3173 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3173 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3173 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3173 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3173 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44387] The complementary binding of VGAM3173 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3173 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3173 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3173 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44388] It is appreciated that VGAM3173 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3173 host target genes. The mRNA of each one of this plurality of VGAM3173 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3173 RNA, herein designated VGAM RNA, and which when bound by VGAM3173 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3173 host target proteins.

[44389] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3173 gene, herein designated VGAM GENE, on one or more VGAM3173 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44390] It is yet further appreciated that a function of VGAM3173 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3173 include diagnosis, prevention and treatment of viral infection by Macaca mulatta rhadinovirus. Specific functions, and accordingly utilities, of VGAM3173 correlate with, and may be deduced from, the identity of the host target genes which VGAM3173 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44391] Nucleotide sequences of the VGAM3173 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3173 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3173 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3173 are further described hereinbelow with reference to Table 1.

[44392] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3173 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44393] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3174 (VGAM3174) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44394] VGAM3174 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3174 was detected is described hereinabove with reference to Figs. 2-8.

[44395] VGAM3174 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Macaca mulatta rhadinovirus. VGAM3174 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44396] VGAM3174 gene, herein designated VGAM GENE, encodes a VGAM3174 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3174 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3174 precursor RNA is designated SEQ ID:71996, and is provided hereinbelow with reference to the sequence listing part.

[44397] VGAM3174 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3174 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[44398] An enzyme complex designated DICER COMPLEX, dices the VGAM3174 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3174 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3174 RNA is designated SEQ ID:71997, and is provided hereinbelow with reference to the sequence listing part.

[44399] VGAM3174 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3174 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3174 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44400] VGAM3174 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3174 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3174 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3174 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3174 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44401] The complementary binding of VGAM3174 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3174 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3174 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3174 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44402] It is appreciated that VGAM3174 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3174 host target genes. The mRNA of each one of this plurality of VGAM3174 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3174 RNA, herein designated VGAM RNA, and which when bound by VGAM3174 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3174 host target proteins.

[44403] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3174 gene, herein designated VGAM GENE, on one or more VGAM3174 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44404] It is yet further appreciated that a function of VGAM3174 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3174 include diagnosis, prevention and treatment of viral infection by *Macaca mulatta* rhadinovirus. Specific functions, and accordingly utilities, of VGAM3174 correlate with, and may be deduced from, the identity of the host target genes which VGAM3174 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44405] Nucleotide sequences of the VGAM3174 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3174 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3174 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3174 are further described hereinbelow with reference to Table 1.

[44406] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3174 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44407] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3175 (VGAM3175) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44408] VGAM3175 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3175 was detected is described hereinabove with reference to Figs. 2-8.

[44409] VGAM3175 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Porcine epidemic diarrhea virus. VGAM3175 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44410] VGAM3175 gene, herein designated VGAM GENE, encodes a VGAM3175 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3175 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3175 precursor RNA is designated SEQ ID:72035, and is provided hereinbelow with reference to the sequence listing part.

[44411] VGAM3175 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3175 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44412] An enzyme complex designated DICER COMPLEX, dices the VGAM3175 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3175 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3175 RNA is designated SEQ ID:72036, and is provided hereinbelow with reference to the sequence listing part.

[44413] VGAM3175 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3175 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3175 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44414] VGAM3175 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3175 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3175 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3175 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3175 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44415] The complementary binding of VGAM3175 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3175 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3175 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3175 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44416] It is appreciated that VGAM3175 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3175 host target genes. The mRNA of each one of this plurality of VGAM3175 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3175 RNA, herein designated VGAM RNA, and which when bound by VGAM3175 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3175 host target proteins.

[44417] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3175 gene, herein designated VGAM GENE, on one or more VGAM3175 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44418] It is yet further appreciated that a function of VGAM3175 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3175 include diagnosis, prevention and treatment of viral infection by Porcine epidemic diarrhea virus. Specific functions, and accordingly utilities, of VGAM3175 correlate with, and may be deduced from, the identity of the host target genes which VGAM3175 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44419] Nucleotide sequences of the VGAM3175 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3175 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3175 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3175 are further described hereinbelow with reference to Table 1.

[44420] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3175 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44421] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3176 (VGAM3176) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44422] VGAM3176 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3176 was detected is described hereinabove with reference to Figs. 2-8.

[44423] VGAM3176 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Variola virus. VGAM3176

host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44424] VGAM3176 gene, herein designated VGAM GENE, encodes a VGAM3176 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3176 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3176 precursor RNA is designated SEQ ID:72052, and is provided hereinbelow with reference to the sequence listing part.

[44425] VGAM3176 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3176 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44426] An enzyme complex designated DICER COMPLEX, dices the VGAM3176 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3176 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3176 RNA is designated SEQ ID:72053, and is provided hereinbelow with reference to the sequence listing part.

[44427] VGAM3176 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3176 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3176 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44428] VGAM3176 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3176 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3176 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3176 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3176 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44429] The complementary binding of VGAM3176 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3176 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3176

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3176 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44430] It is appreciated that VGAM3176 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3176 host target genes. The mRNA of each one of this plurality of VGAM3176 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3176 RNA, herein designated VGAM RNA, and which when bound by VGAM3176 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3176 host target proteins.

[44431] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3176 gene, herein designated VGAM GENE, on one or more VGAM3176 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44432] It is yet further appreciated that a function of VGAM3176 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3176 include diagnosis, prevention and treatment of viral infection by Variola virus. Specific functions, and accordingly utilities, of VGAM3176 correlate with, and may be deduced from, the identity of the host target genes which VGAM3176 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44433] Nucleotide sequences of the VGAM3176 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3176 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3176 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3176 are further described hereinbelow with reference to Table 1.

[44434] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3176 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44435] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3177 (VGAM3177) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44436] VGAM3177 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3177 was detected is described hereinabove with reference to Figs. 2-8.

[44437] VGAM3177 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Triatoma virus. VGAM3177 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[44438] VGAM3177 gene, herein designated VGAM GENE, encodes a VGAM3177 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3177 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3177 precursor RNA is designated SEQ ID:72056, and is provided hereinbelow with reference to the sequence listing part.

[44439] VGAM3177 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3177 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44440] An enzyme complex designated DICER COMPLEX, dices the VGAM3177 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3177 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3177 RNA is designated SEQ ID:72057, and is provided hereinbelow with reference to the sequence listing part.

[44441] VGAM3177 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3177 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3177 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44442] VGAM3177 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3177 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3177 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3177 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3177 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44443] The complementary binding of VGAM3177 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3177 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3177 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3177 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44444] It is appreciated that VGAM3177 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3177 host target genes. The mRNA of each one of this plurality of VGAM3177 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3177 RNA, herein designated VGAM RNA, and which when bound by VGAM3177 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3177 host target proteins.

[44445] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3177 gene, herein designated VGAM GENE, on one or more VGAM3177 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44446] It is yet further appreciated that a function of VGAM3177 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3177 include diagnosis, prevention and treatment of viral infection by Triatoma virus. Specific functions, and accordingly utilities, of VGAM3177 correlate with, and may be deduced from, the identity of the host target genes which VGAM3177 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44447] Nucleotide sequences of the VGAM3177 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3177 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3177 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3177 are further

described hereinbelow with reference to Table 1.

[44448] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3177 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44449] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3178 (VGAM3178) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44450] VGAM3178 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3178 was detected is described hereinabove with reference to Figs. 2-8.

[44451] VGAM3178 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3178 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44452] VGAM3178 gene, herein designated VGAM GENE, encodes a VGAM3178 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3178 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3178 precursor RNA is designated SEQ ID:72069, and is provided hereinbelow with reference to the sequence listing part.

[44453] VGAM3178 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3178 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44454] An enzyme complex designated DICER COMPLEX, dices the VGAM3178 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3178 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3178 RNA is designated SEQ ID:72070, and is provided hereinbelow with reference to the sequence listing part.

[44455] VGAM3178 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3178 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3178 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44456] VGAM3178 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3178 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3178 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3178 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3178 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44457] The complementary binding of VGAM3178 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3178 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3178 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3178 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44458] It is appreciated that VGAM3178 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3178 host target genes. The mRNA of each one of this plurality of VGAM3178 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3178 RNA, herein designated VGAM RNA, and which when bound by VGAM3178 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3178 host target proteins.

[44459] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3178 gene, herein designated VGAM GENE, on one or more VGAM3178 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44460] It is yet further appreciated that a function of VGAM3178 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3178 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3178 correlate with, and may be deduced from, the identity of the host target genes which VGAM3178 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44461] Nucleotide sequences of the VGAM3178 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3178 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3178 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3178 are further described hereinbelow with reference to Table 1.

[44462] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3178 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44463] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3179 (VGAM3179) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44464] VGAM3179 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3179 was detected is described hereinabove with reference to Figs. 2-8.

[44465] VGAM3179 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Newcastle disease virus. VGAM3179 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44466] VGAM3179 gene, herein designated VGAM GENE, encodes

a VGAM3179 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3179 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3179 precursor RNA is designated SEQ ID:72084, and is provided hereinbelow with reference to the sequence listing part.

[44467] VGAM3179 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3179 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44468] An enzyme complex designated DICER COMPLEX, dices the VGAM3179 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3179 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3179 RNA is designated SEQ ID:72085, and is provided hereinbelow with reference to the sequence listing part.

[44469] VGAM3179 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3179 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3179 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44470] VGAM3179 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3179 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3179 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3179 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3179 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44471] The complementary binding of VGAM3179 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3179 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3179 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3179 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[44472] It is appreciated that VGAM3179 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3179 host target genes. The mRNA of each one of this plurality of VGAM3179 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3179 RNA, herein designated VGAM RNA, and which when bound by VGAM3179 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3179 host target proteins.

[44473] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3179 gene, herein designated VGAM GENE, on one or more VGAM3179 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44474] It is yet further appreciated that a function of VGAM3179 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3179 include diagnosis, prevention and treatment of viral infection by Newcastle disease virus. Specific functions, and accordingly utilities, of VGAM3179 correlate with, and may be deduced from, the identity of the host target genes which VGAM3179 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44475] Nucleotide sequences of the VGAM3179 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3179 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3179 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3179 are further described hereinbelow with reference to Table 1.

[44476] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3179 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44477] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3180 (VGAM3180) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44478] VGAM3180 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3180 was detected is described hereinabove with reference to Figs. 2-8.

[44479] VGAM3180 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human adenovirus A. VGAM3180 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44480] VGAM3180 gene, herein designated VGAM GENE, encodes a VGAM3180 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3180 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3180 precursor RNA is designated SEQ ID:72105, and is provided hereinbelow with reference to the sequence listing part.

[44481] VGAM3180 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3180 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44482] An enzyme complex designated DICER COMPLEX, dices the VGAM3180 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3180 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3180 RNA is designated SEQ ID:72106, and is provided hereinbelow with reference to the sequence listing part.

[44483] VGAM3180 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3180 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3180 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44484] VGAM3180 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3180 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3180 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3180 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3180 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44485] The complementary binding of VGAM3180 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3180 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3180 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3180 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44486] It is appreciated that VGAM3180 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3180 host target genes. The mRNA of each one of this plurality of VGAM3180 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3180 RNA, herein designated VGAM RNA, and which when bound by VGAM3180 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3180 host target proteins.

[44487] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3180 gene, herein designated VGAM GENE, on one or more VGAM3180 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44488] It is yet further appreciated that a function of VGAM3180 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3180 include diagnosis, prevention and treatment of viral infection by Human adenovirus A. Specific functions, and accordingly utilities, of VGAM3180 correlate with, and may be deduced from, the identity of the host target genes which VGAM3180 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44489] Nucleotide sequences of the VGAM3180 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3180 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3180 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3180 are further described hereinbelow with reference to Table 1.

[44490] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3180 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44491] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3181 (VGAM3181) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44492] VGAM3181 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3181 was detected is described hereinabove with reference to Figs. 2-8.

[44493] VGAM3181 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 13. VGAM3181 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44494] VGAM3181 gene, herein designated VGAM GENE, encodes a VGAM3181 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3181 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3181 precursor RNA is designated SEQ ID:72111, and is provided hereinbelow with reference to the sequence listing part.

[44495] VGAM3181 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3181 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44496] An enzyme complex designated DICER COMPLEX, dices the VGAM3181 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3181 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3181 RNA is designated SEQ ID:72112, and is provided hereinbelow with reference to the sequence listing part.

[44497] VGAM3181 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3181 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3181 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44498] VGAM3181 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3181 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3181 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3181 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3181 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44499] The complementary binding of VGAM3181 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3181 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3181 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3181 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44500] It is appreciated that VGAM3181 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3181 host target genes. The mRNA of each one of this plurality of VGAM3181 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3181 RNA, herein designated VGAM RNA, and which when bound by VGAM3181 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3181 host target proteins.

[44501] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3181 gene, herein designated VGAM GENE, on one or more VGAM3181 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44502] It is yet further appreciated that a function of VGAM3181 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3181 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 13. Specific functions, and accordingly utilities, of VGAM3181 correlate with, and may be deduced from, the identity of the host target genes which VGAM3181 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44503] Nucleotide sequences of the VGAM3181 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3181 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3181 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3181 are further described hereinbelow with reference to Table 1.

[44504] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3181 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44505] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3182 (VGAM3182) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44506] VGAM3182 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3182 was detected is described hereinabove with reference to Figs. 2–8.

[44507] VGAM3182 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 21. VGAM3182 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44508] VGAM3182 gene, herein designated VGAM GENE, encodes a VGAM3182 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3182 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3182 precursor RNA is designated SEQ ID:72120, and is provided hereinbelow with reference to the sequence listing part.

[44509] VGAM3182 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3182 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44510] An enzyme complex designated DICER COMPLEX, dices the VGAM3182 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3182 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3182 RNA is designated SEQ ID:72121, and is provided hereinbelow with reference to the sequence listing part.

[44511] VGAM3182 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3182 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3182 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44512] VGAM3182 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3182 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3182 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3182 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3182 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44513] The complementary binding of VGAM3182 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3182 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3182 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3182 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44514] It is appreciated that VGAM3182 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3182 host target genes. The mRNA of each one of this plurality of VGAM3182 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3182 RNA, herein designated VGAM RNA, and which when bound by VGAM3182 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3182 host target proteins.

[44515] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3182 gene, herein designated VGAM GENE, on one or more VGAM3182 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [44516] It is yet further appreciated that a function of VGAM3182 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3182 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 21. Specific functions, and accordingly utilities, of VGAM3182 correlate with, and may be deduced from, the identity of the host target genes which VGAM3182 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [44517] Nucleotide sequences of the VGAM3182 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3182 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3182 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3182 are further described hereinbelow with reference to Table 1.
- [44518] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3182 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44519] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3183 (VGAM3183) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44520] VGAM3183 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3183 was detected is described hereinabove with reference to Figs. 2–8.

[44521] VGAM3183 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 21. VGAM3183 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44522] VGAM3183 gene, herein designated VGAM GENE, encodes a VGAM3183 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3183 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3183 precursor RNA is designated SEQ ID:72142, and is provided hereinbelow with reference to the sequence listing part.

[44523] VGAM3183 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3183 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44524] An enzyme complex designated DICER COMPLEX, dices the VGAM3183 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3183 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3183 RNA is designated SEQ ID:72143, and is provided hereinbelow with reference to the sequence listing part.

[44525] VGAM3183 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3183 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3183 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44526] VGAM3183 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3183 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3183 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3183 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3183 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44527] The complementary binding of VGAM3183 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3183 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3183 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3183 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44528] It is appreciated that VGAM3183 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3183 host target genes. The mRNA of

each one of this plurality of VGAM3183 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3183 RNA, herein designated VGAM RNA, and which when bound by VGAM3183 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3183 host target proteins.

[44529] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3183 gene, herein designated VGAM GENE, on one or more VGAM3183 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[44530] It is yet further appreciated that a function of VGAM3183 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3183 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 21. Specific functions, and accordingly utilities, of VGAM3183 correlate with, and may be deduced from, the identity of the host target genes which VGAM3183 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44531] Nucleotide sequences of the VGAM3183 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3183 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3183 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3183 are further described hereinbelow with reference to Table 1.

[44532] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3183 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[44533] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3184 (VGAM3184) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44534] VGAM3184 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3184 was detected is described hereinabove with reference to Figs. 2–8.

[44535] VGAM3184 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 20. VGAM3184 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44536] VGAM3184 gene, herein designated VGAM GENE, encodes a VGAM3184 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3184 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3184 precursor RNA is designated SEQ ID:72188, and is provided hereinbelow with reference to the sequence listing part.

[44537] VGAM3184 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3184 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44538] An enzyme complex designated DICER COMPLEX, dices the VGAM3184 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3184 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3184 RNA is designated SEQ ID:72189,

and is provided hereinbelow with reference to the sequence listing part.

[44539] VGAM3184 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3184 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3184 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44540] VGAM3184 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3184 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3184 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3184 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3184 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44541] The complementary binding of VGAM3184 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3184 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3184 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3184 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44542] It is appreciated that VGAM3184 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3184 host target genes. The mRNA of each one of this plurality of VGAM3184 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3184 RNA, herein designated VGAM RNA, and which when bound by VGAM3184 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3184 host target proteins.

[44543] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3184 gene, herein designated VGAM GENE, on one or more VGAM3184 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44544] It is yet further appreciated that a function of VGAM3184 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3184 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 20. Specific functions, and accordingly utilities, of VGAM3184 correlate with, and may be deduced from, the identity of the host target genes which VGAM3184 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44545] Nucleotide sequences of the VGAM3184 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3184 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3184 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3184 are further described hereinbelow with reference to Table 1.

[44546] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3184 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44547] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3185 (VGAM3185) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44548] VGAM3185 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3185 was detected is described hereinabove with reference to Figs. 2–8.

[44549] VGAM3185 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3185 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44550] VGAM3185 gene, herein designated VGAM GENE, encodes a VGAM3185 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3185 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3185 precu-

sor RNA is designated SEQ ID:72203, and is provided hereinbelow with reference to the sequence listing part.

[44551] VGAM3185 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3185 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44552] An enzyme complex designated DICER COMPLEX, dices the VGAM3185 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3185 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3185 RNA is designated SEQ ID:72204, and is provided hereinbelow with reference to the se-

quence listing part.

[44553] VGAM3185 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3185 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3185 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44554] VGAM3185 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3185 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3185 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3185 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3185 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44555] The complementary binding of VGAM3185 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3185 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3185 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3185 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44556] It is appreciated that VGAM3185 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3185 host target genes. The mRNA of each one of this plurality of VGAM3185 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3185 RNA, herein designated VGAM RNA, and which when bound by VGAM3185 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3185 host target proteins.

[44557] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3185 gene, herein designated VGAM GENE, on one or more VGAM3185 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44558] It is yet further appreciated that a function of VGAM3185

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3185 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3185 correlate with, and may be deduced from, the identity of the host target genes which VGAM3185 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44559] Nucleotide sequences of the VGAM3185 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3185 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3185 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3185 are further described hereinbelow with reference to Table 1.

[44560] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3185 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44561] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3186 (VGAM3186) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44562] VGAM3186 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3186 was detected is described hereinabove with reference to Figs. 2–8.

[44563] VGAM3186 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3186 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44564] VGAM3186 gene, herein designated VGAM GENE, encodes a VGAM3186 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3186 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3186 precursor RNA is designated SEQ ID:72217, and is provided

hereinbelow with reference to the sequence listing part.

[44565] VGAM3186 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3186 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44566] An enzyme complex designated DICER COMPLEX, dices the VGAM3186 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3186 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3186 RNA is designated SEQ ID:72218, and is provided hereinbelow with reference to the sequence listing part.

[44567] VGAM3186 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3186 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3186 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44568] VGAM3186 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3186 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3186 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3186 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3186 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44569] The complementary binding of VGAM3186 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3186 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3186 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3186 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44570] It is appreciated that VGAM3186 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3186 host target genes. The mRNA of each one of this plurality of VGAM3186 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3186 RNA, herein designated VGAM RNA, and which when bound by VGAM3186 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3186 host target proteins.

[44571] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3186 gene, herein designated VGAM GENE, on one or more VGAM3186 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44572] It is yet further appreciated that a function of VGAM3186 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3186 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3186 correlate with, and may be deduced from, the identity of the host target genes which VGAM3186 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44573] Nucleotide sequences of the VGAM3186 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3186 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3186 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3186 are further described hereinbelow with reference to Table 1.

[44574] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3186 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44575] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3187 (VGAM3187) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44576] VGAM3187 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3187 was detected is described hereinabove with reference to Figs. 2–8.

[44577] VGAM3187 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3187 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44578] VGAM3187 gene, herein designated VGAM GENE, encodes a VGAM3187 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3187 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3187 precursor RNA is designated SEQ ID:72222, and is provided hereinbelow with reference to the sequence listing part.

[44579] VGAM3187 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3187 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44580] An enzyme complex designated DICER COMPLEX, dices the VGAM3187 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3187 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3187 RNA is designated SEQ ID:72223, and is provided hereinbelow with reference to the sequence listing part.

[44581] VGAM3187 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3187 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3187 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44582] VGAM3187 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3187 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3187 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3187 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3187 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44583] The complementary binding of VGAM3187 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3187 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3187 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3187 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44584] It is appreciated that VGAM3187 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3187 host target genes. The mRNA of each one of this plurality of VGAM3187 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3187 RNA, herein designated VGAM

RNA, and which when bound by VGAM3187 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3187 host target proteins.

[44585] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3187 gene, herein designated VGAM GENE, on one or more VGAM3187 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44586] It is yet further appreciated that a function of VGAM3187 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3187 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3187 correlate with, and may be deduced from, the identity of the host target genes which VGAM3187 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44587] Nucleotide sequences of the VGAM3187 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3187 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3187 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3187 are further described hereinbelow with reference to Table 1.

[44588] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3187 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44589] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3188 (VGAM3188) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44590] VGAM3188 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3188 was detected is described hereinabove with reference to Figs. 2-8.

[44591] VGAM3188 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3188 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44592] VGAM3188 gene, herein designated VGAM GENE, encodes a VGAM3188 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3188 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3188 precursor RNA is designated SEQ ID:72263, and is provided hereinbelow with reference to the sequence listing part.

[44593] VGAM3188 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3188 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44594] An enzyme complex designated DICER COMPLEX, dices the VGAM3188 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3188 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3188 RNA is designated SEQ ID:72264, and is provided hereinbelow with reference to the sequence listing part.

[44595] VGAM3188 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3188 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3188 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44596] VGAM3188 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3188 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3188 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3188 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3188 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44597] The complementary binding of VGAM3188 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3188 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3188 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3188 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44598] It is appreciated that VGAM3188 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3188 host target genes. The mRNA of each one of this plurality of VGAM3188 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3188 RNA, herein designated VGAM RNA, and which when bound by VGAM3188 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3188 host target proteins.

[44599] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3188 gene, herein designated VGAM GENE, on one or more VGAM3188 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44600] It is yet further appreciated that a function of VGAM3188 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3188 include diagnosis, prevention and

treatment of viral infection by *Melanoplus sanguinipes* entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3188 correlate with, and may be deduced from, the identity of the host target genes which VGAM3188 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44601] Nucleotide sequences of the VGAM3188 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3188 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3188 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3188 are further described hereinbelow with reference to Table 1.

[44602] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3188 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44603] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3189 (VGAM3189) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44604] VGAM3189 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3189 was detected is described hereinabove with reference to Figs. 2–8.

[44605] VGAM3189 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3189 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44606] VGAM3189 gene, herein designated VGAM GENE, encodes a VGAM3189 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3189 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3189 precursor RNA is designated SEQ ID:72274, and is provided hereinbelow with reference to the sequence listing part.

[44607] VGAM3189 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3189 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44608] An enzyme complex designated DICER COMPLEX, dices the VGAM3189 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3189 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3189 RNA is designated SEQ ID:72275, and is provided hereinbelow with reference to the sequence listing part.

[44609] VGAM3189 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3189 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3189 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44610] VGAM3189 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3189 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3189 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3189 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3189 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44611] The complementary binding of VGAM3189 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3189 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3189 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3189 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44612] It is appreciated that VGAM3189 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3189 host target genes. The mRNA of each one of this plurality of VGAM3189 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3189 RNA, herein designated VGAM RNA, and which when bound by VGAM3189 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3189 host target proteins.

[44613] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3189 gene, herein designated VGAM GENE, on one or more VGAM3189 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44614] It is yet further appreciated that a function of VGAM3189 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3189 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Spe-

cific functions, and accordingly utilities, of VGAM3189 correlate with, and may be deduced from, the identity of the host target genes which VGAM3189 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44615] Nucleotide sequences of the VGAM3189 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3189 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3189 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3189 are further described hereinbelow with reference to Table 1.

[44616] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3189 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44617] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3190 (VGAM3190) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[44618] VGAM3190 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3190 was detected is described hereinabove with reference to Figs. 2–8.

[44619] VGAM3190 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3190 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44620] VGAM3190 gene, herein designated VGAM GENE, encodes a VGAM3190 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3190 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3190 precursor RNA is designated SEQ ID:72281, and is provided hereinbelow with reference to the sequence listing part.

[44621] VGAM3190 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3190 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44622] An enzyme complex designated DICER COMPLEX, dices the VGAM3190 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3190 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3190 RNA is designated SEQ ID:72282, and is provided hereinbelow with reference to the sequence listing part.

[44623] VGAM3190 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3190 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3190 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44624] VGAM3190 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3190 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3190 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3190 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3190 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44625] The complementary binding of VGAM3190 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3190 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3190 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3190 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44626] It is appreciated that VGAM3190 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3190 host target genes. The mRNA of each one of this plurality of VGAM3190 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3190 RNA, herein designated VGAM RNA, and which when bound by VGAM3190 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3190 host target proteins.

[44627] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3190 gene, herein designated VGAM GENE, on one or more VGAM3190 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44628] It is yet further appreciated that a function of VGAM3190 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3190 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3190

correlate with, and may be deduced from, the identity of the host target genes which VGAM3190 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44629] Nucleotide sequences of the VGAM3190 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3190 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3190 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3190 are further described hereinbelow with reference to Table 1.

[44630] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3190 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44631] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3191 (VGAM3191) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[44632] VGAM3191 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3191 was detected is described hereinabove with reference to Figs. 2–8.

[44633] VGAM3191 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3191 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44634] VGAM3191 gene, herein designated VGAM GENE, encodes a VGAM3191 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3191 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3191 precursor RNA is designated SEQ ID:72294, and is provided hereinbelow with reference to the sequence listing part.

[44635] VGAM3191 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3191 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44636] An enzyme complex designated DICER COMPLEX, dices the VGAM3191 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3191 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3191 RNA is designated SEQ ID:72295, and is provided hereinbelow with reference to the sequence listing part.

[44637] VGAM3191 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3191 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3191 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44638] VGAM3191 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3191 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3191 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3191 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3191 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44639] The complementary binding of VGAM3191 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3191 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3191 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3191 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44640] It is appreciated that VGAM3191 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3191 host target genes. The mRNA of each one of this plurality of VGAM3191 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3191 RNA, herein designated VGAM RNA, and which when bound by VGAM3191 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3191 host target proteins.

[44641] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3191 gene, herein designated VGAM GENE, on one or more VGAM3191 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44642] It is yet further appreciated that a function of VGAM3191 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3191 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3191 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3191 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44643] Nucleotide sequences of the VGAM3191 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3191 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3191 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3191 are further described hereinbelow with reference to Table 1.

[44644] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3191 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44645] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3192 (VGAM3192) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44646] VGAM3192 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3192 was detected is described hereinabove with reference to Figs. 2–8.

[44647] VGAM3192 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Casphalia extranea densovirus. VGAM3192 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44648] VGAM3192 gene, herein designated VGAM GENE, encodes a VGAM3192 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3192 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3192 precursor RNA is designated SEQ ID:72319, and is provided hereinbelow with reference to the sequence listing part.

[44649] VGAM3192 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3192 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44650] An enzyme complex designated DICER COMPLEX, dices the VGAM3192 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3192 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3192 RNA is designated SEQ ID:72320, and is provided hereinbelow with reference to the sequence listing part.

[44651] VGAM3192 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3192 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3192 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44652] VGAM3192 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3192 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3192 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3192 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3192 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44653] The complementary binding of VGAM3192 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3192 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3192 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3192 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44654] It is appreciated that VGAM3192 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3192 host target genes. The mRNA of each one of this plurality of VGAM3192 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3192 RNA, herein designated VGAM RNA, and which when bound by VGAM3192 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3192 host target proteins.

[44655] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3192 gene, herein designated VGAM GENE, on one or more VGAM3192 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44656] It is yet further appreciated that a function of VGAM3192 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3192 include diagnosis, prevention and treatment of viral infection by Casphalia extranea densovirus. Specific functions, and accordingly utilities, of VGAM3192 correlate with, and may be deduced from, the identity of the host target genes which VGAM3192 binds

and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44657] Nucleotide sequences of the VGAM3192 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3192 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3192 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3192 are further described hereinbelow with reference to Table 1.

[44658] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3192 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44659] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3193 (VGAM3193) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44660] VGAM3193 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3193 was detected is described hereinabove with reference to Figs. 2–8.

[44661] VGAM3193 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Northern cereal mosaic virus. VGAM3193 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44662] VGAM3193 gene, herein designated VGAM GENE, encodes a VGAM3193 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3193 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3193 precursor RNA is designated SEQ ID:72324, and is provided hereinbelow with reference to the sequence listing part.

[44663] VGAM3193 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3193 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44664] An enzyme complex designated DICER COMPLEX, dices the VGAM3193 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3193 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3193 RNA is designated SEQ ID:72325, and is provided hereinbelow with reference to the sequence listing part.

[44665] VGAM3193 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3193 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3193 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44666] VGAM3193 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3193 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3193 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3193 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3193 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[44667] The complementary binding of VGAM3193 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3193 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3193 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3193 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44668] It is appreciated that VGAM3193 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3193 host target genes. The mRNA of each one of this plurality of VGAM3193 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3193 RNA, herein designated VGAM RNA, and which when bound by VGAM3193 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3193 host target proteins.

[44669] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3193 gene, herein designated VGAM GENE, on one or more VGAM3193 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44670] It is yet further appreciated that a function of VGAM3193 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3193 include diagnosis, prevention and treatment of viral infection by Northern cereal mosaic virus. Specific functions, and accordingly utilities, of VGAM3193 correlate with, and may be deduced from, the identity of the host target genes which VGAM3193 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[44671] Nucleotide sequences of the VGAM3193 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3193 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3193 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3193 are further described hereinbelow with reference to Table 1.

[44672] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3193 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44673] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3194 (VGAM3194) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44674] VGAM3194 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3194 was detected is described hereinabove with reference to Figs. 2–8.

[44675] VGAM3194 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3194 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44676] VGAM3194 gene, herein designated VGAM GENE, encodes a VGAM3194 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3194 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3194 precursor RNA is designated SEQ ID:72339, and is provided hereinbelow with reference to the sequence listing part.

[44677] VGAM3194 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3194 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44678] An enzyme complex designated DICER COMPLEX, dices the VGAM3194 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3194 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3194 RNA is designated SEQ ID:72340, and is provided hereinbelow with reference to the sequence listing part.

[44679] VGAM3194 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3194 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3194 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[44680] VGAM3194 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3194 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3194 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3194 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3194 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44681] The complementary binding of VGAM3194 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3194 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3194 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3194 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44682] It is appreciated that VGAM3194 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3194 host target genes. The mRNA of each one of this plurality of VGAM3194 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3194 RNA, herein designated VGAM RNA, and which when bound by VGAM3194 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3194 host target proteins.

[44683] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3194 gene, herein designated VGAM GENE, on one

or more VGAM3194 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44684] It is yet further appreciated that a function of VGAM3194 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3194 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3194 correlate with, and may be deduced from, the identity of the host target genes which VGAM3194 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44685] Nucleotide sequences of the VGAM3194 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3194 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3194 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3194 are further described hereinbelow with reference to Table 1.

[44686] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3194 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44687] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3195 (VGAM3195) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44688] VGAM3195 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3195 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[44689] VGAM3195 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3195 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44690] VGAM3195 gene, herein designated VGAM GENE, encodes a VGAM3195 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3195 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3195 precursor RNA is designated SEQ ID:72361, and is provided hereinbelow with reference to the sequence listing part.

[44691] VGAM3195 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3195 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44692] An enzyme complex designated DICER COMPLEX, dices the VGAM3195 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3195 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3195 RNA is designated SEQ ID:72362, and is provided hereinbelow with reference to the sequence listing part.

[44693] VGAM3195 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3195 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3195 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44694] VGAM3195 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3195 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3195 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3195 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3195 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44695] The complementary binding of VGAM3195 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3195 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3195 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3195 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44696] It is appreciated that VGAM3195 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3195 host target genes. The mRNA of each one of this plurality of VGAM3195 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3195 RNA, herein designated VGAM RNA, and which when bound by VGAM3195 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3195 host target proteins.

[44697] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3195 gene, herein designated VGAM GENE, on one or more VGAM3195 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44698] It is yet further appreciated that a function of VGAM3195 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3195 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3195 correlate with, and may be deduced from, the identity of the host target genes which VGAM3195 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44699] Nucleotide sequences of the VGAM3195 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3195 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3195 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3195 are further described hereinbelow with reference to Table 1.

[44700] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3195 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44701] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3196 (VGAM3196) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44702] VGAM3196 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3196 was detected is described hereinabove with reference to Figs. 2-8.

[44703] VGAM3196 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3196 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44704] VGAM3196 gene, herein designated VGAM GENE, encodes a VGAM3196 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3196 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3196 precursor RNA is designated SEQ ID:72367, and is provided hereinbelow with reference to the sequence listing part.

[44705] VGAM3196 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3196 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[44706] An enzyme complex designated DICER COMPLEX, dices the VGAM3196 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3196 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3196 RNA is designated SEQ ID:72368, and is provided hereinbelow with reference to the sequence listing part.

[44707] VGAM3196 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3196 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3196 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44708] VGAM3196 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3196 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3196 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3196 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3196 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44709] The complementary binding of VGAM3196 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3196 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3196 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3196 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44710] It is appreciated that VGAM3196 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3196 host target genes. The mRNA of each one of this plurality of VGAM3196 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3196 RNA, herein designated VGAM RNA, and which when bound by VGAM3196 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3196 host target proteins.

[44711] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3196 gene, herein designated VGAM GENE, on one or more VGAM3196 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44712] It is yet further appreciated that a function of VGAM3196 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3196 include diagnosis, prevention and treatment of viral infection by Mollusum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3196 correlate with, and may be deduced from, the identity of the host target genes which VGAM3196 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44713] Nucleotide sequences of the VGAM3196 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3196 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3196 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3196 are further described hereinbelow with reference to Table 1.

[44714] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3196 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44715] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3197 (VGAM3197) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44716] VGAM3197 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3197 was detected is described hereinabove with reference to Figs. 2-8.

[44717] VGAM3197 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Molluscum contagiosum virus. VGAM3197 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44718] VGAM3197 gene, herein designated VGAM GENE, encodes a VGAM3197 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3197 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3197 precursor RNA is designated SEQ ID:72371, and is provided hereinbelow with reference to the sequence listing part.

[44719] VGAM3197 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3197 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44720] An enzyme complex designated DICER COMPLEX, dices the VGAM3197 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3197 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3197 RNA is designated SEQ ID:72372, and is provided hereinbelow with reference to the sequence listing part.

[44721] VGAM3197 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3197 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3197 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44722] VGAM3197 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3197 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3197 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3197 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3197 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44723] The complementary binding of VGAM3197 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3197 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3197 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3197 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44724] It is appreciated that VGAM3197 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3197 host target genes. The mRNA of each one of this plurality of VGAM3197 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3197 RNA, herein designated VGAM RNA, and which when bound by VGAM3197 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3197 host target proteins.

[44725] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3197 gene, herein designated VGAM GENE, on one or more VGAM3197 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44726] It is yet further appreciated that a function of VGAM3197 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3197 include diagnosis, prevention and treatment of viral infection by Mollusum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3197 correlate with, and may be deduced from, the identity of the host target genes which VGAM3197 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44727] Nucleotide sequences of the VGAM3197 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3197 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3197 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3197 are further described hereinbelow with reference to Table 1.

[44728] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3197 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44729] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3198 (VGAM3198) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44730] VGAM3198 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3198 was detected is described hereinabove with reference to Figs. 2-8.

[44731] VGAM3198 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus

type 21. VGAM3198 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44732] VGAM3198 gene, herein designated VGAM GENE, encodes a VGAM3198 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3198 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3198 precursor RNA is designated SEQ ID:72399, and is provided hereinbelow with reference to the sequence listing part.

[44733] VGAM3198 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3198 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44734] An enzyme complex designated DICER COMPLEX, dices

the VGAM3198 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3198 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3198 RNA is designated SEQ ID:72400, and is provided hereinbelow with reference to the sequence listing part.

[44735] VGAM3198 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3198 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3198 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44736] VGAM3198 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3198 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3198 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3198 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3198 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44737] The complementary binding of VGAM3198 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3198 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3198 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3198 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44738] It is appreciated that VGAM3198 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3198 host target genes. The mRNA of each one of this plurality of VGAM3198 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3198 RNA, herein designated VGAM RNA, and which when bound by VGAM3198 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3198 host target proteins.

[44739] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3198 gene, herein designated VGAM GENE, on one or more VGAM3198 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44740] It is yet further appreciated that a function of VGAM3198 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3198 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 21. Specific functions, and accordingly utilities, of VGAM3198 correlate with, and may be deduced from, the identity of the host target genes which VGAM3198 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44741] Nucleotide sequences of the VGAM3198 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3198 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3198 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3198 are further described hereinbelow with reference to Table 1.

[44742] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3198 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44743] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3199 (VGAM3199) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44744] VGAM3199 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3199 was detected is described hereinabove with reference to Figs. 2-8.

[44745] VGAM3199 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus. VGAM3199 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[44746] VGAM3199 gene, herein designated VGAM GENE, encodes a VGAM3199 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3199 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3199 precursor RNA is designated SEQ ID:72413, and is provided hereinbelow with reference to the sequence listing part.

[44747] VGAM3199 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3199 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44748] An enzyme complex designated DICER COMPLEX, dices the VGAM3199 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3199 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3199 RNA is designated SEQ ID:72414, and is provided hereinbelow with reference to the sequence listing part.

[44749] VGAM3199 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3199 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3199 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44750] VGAM3199 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3199 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3199 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3199 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3199 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44751] The complementary binding of VGAM3199 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3199 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3199

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3199 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44752] It is appreciated that VGAM3199 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3199 host target genes. The mRNA of each one of this plurality of VGAM3199 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3199 RNA, herein designated VGAM RNA, and which when bound by VGAM3199 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3199 host target proteins.

[44753] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3199 gene, herein designated VGAM GENE, on one or more VGAM3199 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44754] It is yet further appreciated that a function of VGAM3199 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3199 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3199 correlate with, and may be deduced from, the identity of the host target genes which VGAM3199 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44755] Nucleotide sequences of the VGAM3199 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3199 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3199 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3199 are further described hereinbelow with reference to Table 1.

[44756] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3199 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44757] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3200 (VGAM3200) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44758] VGAM3200 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3200 was detected is described hereinabove with reference to Figs. 2-8.

[44759] VGAM3200 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3200 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[44760] VGAM3200 gene, herein designated VGAM GENE, encodes a VGAM3200 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3200 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3200 precursor RNA is designated SEQ ID:72427, and is provided hereinbelow with reference to the sequence listing part.

[44761] VGAM3200 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3200 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44762] An enzyme complex designated DICER COMPLEX, dices the VGAM3200 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3200 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3200 RNA is designated SEQ ID:72428, and is provided hereinbelow with reference to the sequence listing part.

[44763] VGAM3200 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3200 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3200 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44764] VGAM3200 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3200 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3200 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3200 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3200 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44765] The complementary binding of VGAM3200 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3200 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3200 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3200 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44766] It is appreciated that VGAM3200 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3200 host target genes. The mRNA of each one of this plurality of VGAM3200 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3200 RNA, herein designated VGAM RNA, and which when bound by VGAM3200 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3200 host target proteins.

[44767] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3200 gene, herein designated VGAM GENE, on one or more VGAM3200 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44768] It is yet further appreciated that a function of VGAM3200 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3200 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3200 correlate with, and may be deduced from, the identity of the host target genes which VGAM3200 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44769] Nucleotide sequences of the VGAM3200 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3200 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3200 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3200 are further

described hereinbelow with reference to Table 1.

[44770] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3200 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44771] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3201 (VGAM3201) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44772] VGAM3201 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3201 was detected is described hereinabove with reference to Figs. 2-8.

[44773] VGAM3201 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3201 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44774] VGAM3201 gene, herein designated VGAM GENE, encodes a VGAM3201 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3201 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3201 precursor RNA is designated SEQ ID:72441, and is provided hereinbelow with reference to the sequence listing part.

[44775] VGAM3201 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3201 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44776] An enzyme complex designated DICER COMPLEX, dices the VGAM3201 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3201 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3201 RNA is designated SEQ ID:72442, and is provided hereinbelow with reference to the sequence listing part.

[44777] VGAM3201 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3201 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3201 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44778] VGAM3201 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3201 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3201 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3201 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3201 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44779] The complementary binding of VGAM3201 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3201 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3201 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3201 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44780] It is appreciated that VGAM3201 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3201 host target genes. The mRNA of each one of this plurality of VGAM3201 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3201 RNA, herein designated VGAM RNA, and which when bound by VGAM3201 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3201 host target proteins.

[44781] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3201 gene, herein designated VGAM GENE, on one or more VGAM3201 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44782] It is yet further appreciated that a function of VGAM3201 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3201 include diagnosis, prevention and treatment of viral infection by *Melanoplus sanguinipes* entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3201 correlate with, and may be deduced from, the identity of the host target genes which VGAM3201 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44783] Nucleotide sequences of the VGAM3201 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3201 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3201 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3201 are further described hereinbelow with reference to Table 1.

[44784] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3201 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44785] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3202 (VGAM3202) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44786] VGAM3202 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3202 was detected is described hereinabove with reference to Figs. 2-8.

[44787] VGAM3202 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Red clover mottle virus. VGAM3202 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44788] VGAM3202 gene, herein designated VGAM GENE, encodes

a VGAM3202 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3202 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3202 precursor RNA is designated SEQ ID:72450, and is provided hereinbelow with reference to the sequence listing part.

[44789] VGAM3202 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3202 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44790] An enzyme complex designated DICER COMPLEX, dices the VGAM3202 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3202 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3202 RNA is designated SEQ ID:72451, and is provided hereinbelow with reference to the sequence listing part.

[44791] VGAM3202 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3202 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3202 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44792] VGAM3202 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3202 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3202 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3202 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3202 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44793] The complementary binding of VGAM3202 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3202 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3202 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3202 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[44794] It is appreciated that VGAM3202 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3202 host target genes. The mRNA of each one of this plurality of VGAM3202 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3202 RNA, herein designated VGAM RNA, and which when bound by VGAM3202 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3202 host target proteins.

[44795] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3202 gene, herein designated VGAM GENE, on one or more VGAM3202 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44796] It is yet further appreciated that a function of VGAM3202 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3202 include diagnosis, prevention and treatment of viral infection by Red clover mottle virus. Specific functions, and accordingly utilities, of VGAM3202 correlate with, and may be deduced from, the identity of the host target genes which VGAM3202 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44797] Nucleotide sequences of the VGAM3202 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3202 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3202 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3202 are further described hereinbelow with reference to Table 1.

[44798] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3202 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44799] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3203 (VGAM3203) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44800] VGAM3203 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3203 was detected is described hereinabove with reference to Figs. 2-8.

[44801] VGAM3203 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3203 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44802] VGAM3203 gene, herein designated VGAM GENE, encodes a VGAM3203 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3203 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3203 precursor RNA is designated SEQ ID:72455, and is provided hereinbelow with reference to the sequence listing part.

[44803] VGAM3203 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3203 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44804] An enzyme complex designated DICER COMPLEX, dices the VGAM3203 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3203 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3203 RNA is designated SEQ ID:72456, and is provided hereinbelow with reference to the sequence listing part.

[44805] VGAM3203 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3203 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3203 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44806] VGAM3203 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3203 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3203 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3203 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3203 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44807] The complementary binding of VGAM3203 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3203 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3203 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3203 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44808] It is appreciated that VGAM3203 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3203 host target genes. The mRNA of each one of this plurality of VGAM3203 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3203 RNA, herein designated VGAM RNA, and which when bound by VGAM3203 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3203 host target proteins.

[44809] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3203 gene, herein designated VGAM GENE, on one or more VGAM3203 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44810] It is yet further appreciated that a function of VGAM3203 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3203 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3203 correlate with, and may be deduced from, the identity of the host target genes which VGAM3203 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44811] Nucleotide sequences of the VGAM3203 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3203 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3203 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3203 are further described hereinbelow with reference to Table 1.

[44812] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3203 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44813] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3204 (VGAM3204) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44814] VGAM3204 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3204 was detected is described hereinabove with reference to Figs. 2-8.

[44815] VGAM3204 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine coronavirus. VGAM3204 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44816] VGAM3204 gene, herein designated VGAM GENE, encodes a VGAM3204 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3204 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3204 precursor RNA is designated SEQ ID:72490, and is provided hereinbelow with reference to the sequence listing part.

[44817] VGAM3204 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3204 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44818] An enzyme complex designated DICER COMPLEX, dices the VGAM3204 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3204 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3204 RNA is designated SEQ ID:72491, and is provided hereinbelow with reference to the sequence listing part.

[44819] VGAM3204 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3204 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3204 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44820] VGAM3204 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3204 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3204 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3204 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3204 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44821] The complementary binding of VGAM3204 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3204 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3204 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3204 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44822] It is appreciated that VGAM3204 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3204 host target genes. The mRNA of each one of this plurality of VGAM3204 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3204 RNA, herein designated VGAM RNA, and which when bound by VGAM3204 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3204 host target proteins.

[44823] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3204 gene, herein designated VGAM GENE, on one or more VGAM3204 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44824] It is yet further appreciated that a function of VGAM3204 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3204 include diagnosis, prevention and treatment of viral infection by Bovine coronavirus. Specific functions, and accordingly utilities, of VGAM3204 correlate with, and may be deduced from, the identity of the host target genes which VGAM3204 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44825] Nucleotide sequences of the VGAM3204 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3204 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3204 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3204 are further described hereinbelow with reference to Table 1.

[44826] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3204 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44827] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3205 (VGAM3205) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44828] VGAM3205 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3205 was detected is described hereinabove with reference to Figs. 2–8.

[44829] VGAM3205 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Aedes albopictus densovirus. VGAM3205 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44830] VGAM3205 gene, herein designated VGAM GENE, encodes a VGAM3205 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3205 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3205 precursor RNA is designated SEQ ID:72494, and is provided hereinbelow with reference to the sequence listing part.

[44831] VGAM3205 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3205 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44832] An enzyme complex designated DICER COMPLEX, dices the VGAM3205 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3205 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3205 RNA is designated SEQ ID:72495, and is provided hereinbelow with reference to the sequence listing part.

[44833] VGAM3205 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3205 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3205 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44834] VGAM3205 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3205 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3205 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3205 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3205 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44835] The complementary binding of VGAM3205 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3205 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3205 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3205 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44836] It is appreciated that VGAM3205 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3205 host target genes. The mRNA of each one of this plurality of VGAM3205 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3205 RNA, herein designated VGAM RNA, and which when bound by VGAM3205 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3205 host target proteins.

[44837] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3205 gene, herein designated VGAM GENE, on one or more VGAM3205 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [44838] It is yet further appreciated that a function of VGAM3205 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3205 include diagnosis, prevention and treatment of viral infection by *Aedes albopictus* denso-virus. Specific functions, and accordingly utilities, of VGAM3205 correlate with, and may be deduced from, the identity of the host target genes which VGAM3205 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [44839] Nucleotide sequences of the VGAM3205 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3205 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3205 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3205 are further described hereinbelow with reference to Table 1.
- [44840] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3205 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44841] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3206 (VGAM3206) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44842] VGAM3206 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3206 was detected is described hereinabove with reference to Figs. 2-8.

[44843] VGAM3206 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3206 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44844] VGAM3206 gene, herein designated VGAM GENE, encodes a VGAM3206 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3206 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3206 precursor RNA is designated SEQ ID:72500, and is provided hereinbelow with reference to the sequence listing part.

[44845] VGAM3206 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3206 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44846] An enzyme complex designated DICER COMPLEX, dices the VGAM3206 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3206 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3206 RNA is designated SEQ ID:72501, and is provided hereinbelow with reference to the sequence listing part.

[44847] VGAM3206 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3206 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3206 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44848] VGAM3206 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3206 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3206 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3206 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3206 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44849] The complementary binding of VGAM3206 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3206 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3206 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3206 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44850] It is appreciated that VGAM3206 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3206 host target genes. The mRNA of

each one of this plurality of VGAM3206 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3206 RNA, herein designated VGAM RNA, and which when bound by VGAM3206 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3206 host target proteins.

[44851] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3206 gene, herein designated VGAM GENE, on one or more VGAM3206 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[44852] It is yet further appreciated that a function of VGAM3206 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3206 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3206 correlate with, and may be deduced from, the identity of the host target genes which VGAM3206 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44853] Nucleotide sequences of the VGAM3206 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3206 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3206 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3206 are further described hereinbelow with reference to Table 1.

[44854] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3206 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[44855] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3207 (VGAM3207) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44856] VGAM3207 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3207 was detected is described hereinabove with reference to Figs. 2–8.

[44857] VGAM3207 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Helminthosporium victoriae virus 190S. VGAM3207 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44858] VGAM3207 gene, herein designated VGAM GENE, encodes a VGAM3207 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3207 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3207 precursor

sor RNA is designated SEQ ID:72510, and is provided hereinbelow with reference to the sequence listing part.

[44859] VGAM3207 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3207 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44860] An enzyme complex designated DICER COMPLEX, dices the VGAM3207 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3207 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3207 RNA is designated SEQ ID:72511, and is provided hereinbelow with reference to the se-

quence listing part.

[44861] VGAM3207 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3207 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3207 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44862] VGAM3207 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3207 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3207 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3207 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3207 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44863] The complementary binding of VGAM3207 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3207 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3207 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3207 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44864] It is appreciated that VGAM3207 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3207 host target genes. The mRNA of each one of this plurality of VGAM3207 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3207 RNA, herein designated VGAM RNA, and which when bound by VGAM3207 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3207 host target proteins.

[44865] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3207 gene, herein designated VGAM GENE, on one or more VGAM3207 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44866] It is yet further appreciated that a function of VGAM3207

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3207 include diagnosis, prevention and treatment of viral infection by Helminthosporium victoriae virus 190S. Specific functions, and accordingly utilities, of VGAM3207 correlate with, and may be deduced from, the identity of the host target genes which VGAM3207 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44867] Nucleotide sequences of the VGAM3207 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3207 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3207 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3207 are further described hereinbelow with reference to Table 1.

[44868] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3207 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44869] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3208 (VGAM3208) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44870] VGAM3208 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3208 was detected is described hereinabove with reference to Figs. 2–8.

[44871] VGAM3208 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3208 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44872] VGAM3208 gene, herein designated VGAM GENE, encodes a VGAM3208 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3208 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3208 precursor RNA is designated SEQ ID:72522, and is provided

hereinbelow with reference to the sequence listing part.

[44873] VGAM3208 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3208 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44874] An enzyme complex designated DICER COMPLEX, dices the VGAM3208 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3208 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3208 RNA is designated SEQ ID:72523, and is provided hereinbelow with reference to the sequence listing part.

[44875] VGAM3208 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3208 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3208 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44876] VGAM3208 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3208 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3208 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3208 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3208 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44877] The complementary binding of VGAM3208 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3208 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3208 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3208 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44878] It is appreciated that VGAM3208 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3208 host target genes. The mRNA of each one of this plurality of VGAM3208 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3208 RNA, herein designated VGAM RNA, and which when bound by VGAM3208 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3208 host target proteins.

[44879] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3208 gene, herein designated VGAM GENE, on one or more VGAM3208 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44880] It is yet further appreciated that a function of VGAM3208 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3208 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3208 correlate with, and may be deduced from, the identity of the host target genes which VGAM3208 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44881] Nucleotide sequences of the VGAM3208 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3208 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3208 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3208 are further described hereinbelow with reference to Table 1.

[44882] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3208 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44883] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3209 (VGAM3209) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44884] VGAM3209 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3209 was detected is described hereinabove with reference to Figs. 2–8.

[44885] VGAM3209 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ovine lentivirus. VGAM3209 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44886] VGAM3209 gene, herein designated VGAM GENE, encodes a VGAM3209 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3209 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3209 precursor RNA is designated SEQ ID:72528, and is provided hereinbelow with reference to the sequence listing part.

[44887] VGAM3209 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3209 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44888] An enzyme complex designated DICER COMPLEX, dices the VGAM3209 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3209 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3209 RNA is designated SEQ ID:72529, and is provided hereinbelow with reference to the sequence listing part.

[44889] VGAM3209 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3209 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3209 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44890] VGAM3209 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3209 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3209 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3209 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3209 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44891] The complementary binding of VGAM3209 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3209 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3209 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3209 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44892] It is appreciated that VGAM3209 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3209 host target genes. The mRNA of each one of this plurality of VGAM3209 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3209 RNA, herein designated VGAM

RNA, and which when bound by VGAM3209 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3209 host target proteins.

[44893] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3209 gene, herein designated VGAM GENE, on one or more VGAM3209 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44894] It is yet further appreciated that a function of VGAM3209 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3209 include diagnosis, prevention and treatment of viral infection by Ovine lentivirus. Specific functions, and accordingly utilities, of VGAM3209 correlate with, and may be deduced from, the identity of the host target genes which VGAM3209 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44895] Nucleotide sequences of the VGAM3209 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3209 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3209 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3209 are further described hereinbelow with reference to Table 1.

[44896] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3209 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44897] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3210 (VGAM3210) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44898] VGAM3210 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3210 was detected is described hereinabove with reference to Figs. 2-8.

[44899] VGAM3210 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ovine lentivirus. VGAM3210 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44900] VGAM3210 gene, herein designated VGAM GENE, encodes a VGAM3210 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3210 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3210 precursor RNA is designated SEQ ID:72545, and is provided hereinbelow with reference to the sequence listing part.

[44901] VGAM3210 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3210 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44902] An enzyme complex designated DICER COMPLEX, dices the VGAM3210 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3210 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3210 RNA is designated SEQ ID:72546, and is provided hereinbelow with reference to the sequence listing part.

[44903] VGAM3210 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3210 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3210 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44904] VGAM3210 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3210 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3210 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3210 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3210 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44905] The complementary binding of VGAM3210 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3210 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3210 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3210 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44906] It is appreciated that VGAM3210 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3210 host target genes. The mRNA of each one of this plurality of VGAM3210 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3210 RNA, herein designated VGAM RNA, and which when bound by VGAM3210 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3210 host target proteins.

[44907] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3210 gene, herein designated VGAM GENE, on one or more VGAM3210 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44908] It is yet further appreciated that a function of VGAM3210 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3210 include diagnosis, prevention and

treatment of viral infection by Ovine lentivirus. Specific functions, and accordingly utilities, of VGAM3210 correlate with, and may be deduced from, the identity of the host target genes which VGAM3210 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44909] Nucleotide sequences of the VGAM3210 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3210 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3210 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3210 are further described hereinbelow with reference to Table 1.

[44910] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3210 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44911] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3211 (VGAM3211) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44912] VGAM3211 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3211 was detected is described hereinabove with reference to Figs. 2–8.

[44913] VGAM3211 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Peanut mottle virus. VGAM3211 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44914] VGAM3211 gene, herein designated VGAM GENE, encodes a VGAM3211 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3211 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3211 precursor RNA is designated SEQ ID:72553, and is provided hereinbelow with reference to the sequence listing part.

[44915] VGAM3211 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3211 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44916] An enzyme complex designated DICER COMPLEX, dices the VGAM3211 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3211 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3211 RNA is designated SEQ ID:72554, and is provided hereinbelow with reference to the sequence listing part.

[44917] VGAM3211 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3211 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3211 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44918] VGAM3211 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3211 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3211 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3211 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3211 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44919] The complementary binding of VGAM3211 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3211 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3211 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3211 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44920] It is appreciated that VGAM3211 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3211 host target genes. The mRNA of each one of this plurality of VGAM3211 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3211 RNA, herein designated VGAM RNA, and which when bound by VGAM3211 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3211 host target proteins.

[44921] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3211 gene, herein designated VGAM GENE, on one or more VGAM3211 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44922] It is yet further appreciated that a function of VGAM3211 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3211 include diagnosis, prevention and treatment of viral infection by Peanut mottle virus. Specific

functions, and accordingly utilities, of VGAM3211 correlate with, and may be deduced from, the identity of the host target genes which VGAM3211 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44923] Nucleotide sequences of the VGAM3211 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3211 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3211 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3211 are further described hereinbelow with reference to Table 1.

[44924] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3211 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44925] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3212 (VGAM3212) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[44926] VGAM3212 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3212 was detected is described hereinabove with reference to Figs. 2–8.

[44927] VGAM3212 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Peanut mottle virus. VGAM3212 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44928] VGAM3212 gene, herein designated VGAM GENE, encodes a VGAM3212 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3212 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3212 precursor RNA is designated SEQ ID:72560, and is provided hereinbelow with reference to the sequence listing part.

[44929] VGAM3212 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3212 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44930] An enzyme complex designated DICER COMPLEX, dices the VGAM3212 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3212 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3212 RNA is designated SEQ ID:72561, and is provided hereinbelow with reference to the sequence listing part.

[44931] VGAM3212 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3212 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3212 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44932] VGAM3212 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3212 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3212 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3212 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3212 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44933] The complementary binding of VGAM3212 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3212 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3212 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3212 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44934] It is appreciated that VGAM3212 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3212 host target genes. The mRNA of each one of this plurality of VGAM3212 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3212 RNA, herein designated VGAM RNA, and which when bound by VGAM3212 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3212 host target proteins.

[44935] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3212 gene, herein designated VGAM GENE, on one or more VGAM3212 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44936] It is yet further appreciated that a function of VGAM3212 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3212 include diagnosis, prevention and treatment of viral infection by Peanut mottle virus. Specific functions, and accordingly utilities, of VGAM3212 corre-

late with, and may be deduced from, the identity of the host target genes which VGAM3212 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44937] Nucleotide sequences of the VGAM3212 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3212 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3212 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3212 are further described hereinbelow with reference to Table 1.

[44938] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3212 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44939] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3213 (VGAM3213) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[44940] VGAM3213 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3213 was detected is described hereinabove with reference to Figs. 2–8.

[44941] VGAM3213 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice yellow stunt virus. VGAM3213 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44942] VGAM3213 gene, herein designated VGAM GENE, encodes a VGAM3213 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3213 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3213 precursor RNA is designated SEQ ID:72578, and is provided hereinbelow with reference to the sequence listing part.

[44943] VGAM3213 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3213 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44944] An enzyme complex designated DICER COMPLEX, dices the VGAM3213 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3213 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3213 RNA is designated SEQ ID:72579, and is provided hereinbelow with reference to the sequence listing part.

[44945] VGAM3213 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3213 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3213 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44946] VGAM3213 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3213 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3213 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3213 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3213 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44947] The complementary binding of VGAM3213 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3213 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3213 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3213 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44948] It is appreciated that VGAM3213 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3213 host target genes. The mRNA of each one of this plurality of VGAM3213 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3213 RNA, herein designated VGAM RNA, and which when bound by VGAM3213 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3213 host target proteins.

[44949] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3213 gene, herein designated VGAM GENE, on one or more VGAM3213 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44950] It is yet further appreciated that a function of VGAM3213 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3213 include diagnosis, prevention and treatment of viral infection by Rice yellow stunt virus. Specific functions, and accordingly utilities, of VGAM3213 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3213 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44951] Nucleotide sequences of the VGAM3213 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3213 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3213 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3213 are further described hereinbelow with reference to Table 1.

[44952] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3213 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44953] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3214 (VGAM3214) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44954] VGAM3214 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3214 was detected is described hereinabove with reference to Figs. 2–8.

[44955] VGAM3214 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice yellow stunt virus. VGAM3214 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44956] VGAM3214 gene, herein designated VGAM GENE, encodes a VGAM3214 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3214 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3214 precursor RNA is designated SEQ ID:72636, and is provided hereinbelow with reference to the sequence listing part.

[44957] VGAM3214 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3214 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44958] An enzyme complex designated DICER COMPLEX, dices the VGAM3214 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3214 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3214 RNA is designated SEQ ID:72637, and is provided hereinbelow with reference to the sequence listing part.

[44959] VGAM3214 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3214 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3214 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44960] VGAM3214 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3214 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3214 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3214 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3214 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44961] The complementary binding of VGAM3214 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3214 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3214 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3214 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44962] It is appreciated that VGAM3214 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3214 host target genes. The mRNA of each one of this plurality of VGAM3214 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3214 RNA, herein designated VGAM RNA, and which when bound by VGAM3214 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3214 host target proteins.

[44963] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3214 gene, herein designated VGAM GENE, on one or more VGAM3214 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44964] It is yet further appreciated that a function of VGAM3214 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3214 include diagnosis, prevention and treatment of viral infection by Rice yellow stunt virus. Specific functions, and accordingly utilities, of VGAM3214 correlate with, and may be deduced from, the identity of the host target genes which VGAM3214 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[44965] Nucleotide sequences of the VGAM3214 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3214 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3214 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3214 are further described hereinbelow with reference to Table 1.

[44966] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3214 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44967] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3215 (VGAM3215) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44968] VGAM3215 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3215 was detected is described hereinabove with reference to Figs. 2–8.

[44969] VGAM3215 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3215 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44970] VGAM3215 gene, herein designated VGAM GENE, encodes a VGAM3215 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3215 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3215 precursor RNA is designated SEQ ID:72645, and is provided hereinbelow with reference to the sequence listing part.

[44971] VGAM3215 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3215 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44972] An enzyme complex designated DICER COMPLEX, dices the VGAM3215 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3215 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3215 RNA is designated SEQ ID:72646, and is provided hereinbelow with reference to the sequence listing part.

[44973] VGAM3215 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3215 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3215 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[44974] VGAM3215 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3215 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3215 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3215 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3215 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[44975] The complementary binding of VGAM3215 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3215 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3215 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3215 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44976] It is appreciated that VGAM3215 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3215 host target genes. The mRNA of each one of this plurality of VGAM3215 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3215 RNA, herein designated VGAM RNA, and which when bound by VGAM3215 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3215 host target proteins.

[44977] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3215 gene, herein designated VGAM GENE, on one or more VGAM3215 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44978] It is yet further appreciated that a function of VGAM3215 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3215 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3215 correlate with, and may be deduced from, the identity of the host target genes which VGAM3215 binds and inhibits, and the function of these

host target genes, as elaborated hereinbelow.

[44979] Nucleotide sequences of the VGAM3215 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3215 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3215 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3215 are further described hereinbelow with reference to Table 1.

[44980] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3215 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44981] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3216 (VGAM3216) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44982] VGAM3216 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3216 was detected is described hereinabove with reference to Figs. 2–8.

[44983] VGAM3216 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3216 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44984] VGAM3216 gene, herein designated VGAM GENE, encodes a VGAM3216 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3216 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3216 precursor RNA is designated SEQ ID:72685, and is provided hereinbelow with reference to the sequence listing part.

[44985] VGAM3216 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3216 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[44986] An enzyme complex designated DICER COMPLEX, dices the VGAM3216 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3216 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3216 RNA is designated SEQ ID:72686, and is provided hereinbelow with reference to the sequence listing part.

[44987] VGAM3216 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3216 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3216 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[44988] VGAM3216 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3216 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3216 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3216 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3216 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[44989] The complementary binding of VGAM3216 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3216 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3216 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3216 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[44990] It is appreciated that VGAM3216 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3216 host target genes. The mRNA of each one of this plurality of VGAM3216 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3216 RNA, herein designated VGAM RNA, and which when bound by VGAM3216 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3216 host target proteins.

[44991] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3216 gene, herein designated VGAM GENE, on one

or more VGAM3216 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[44992] It is yet further appreciated that a function of VGAM3216 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3216 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3216 correlate with, and may be deduced from, the identity of the host target genes which VGAM3216 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[44993] Nucleotide sequences of the VGAM3216 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3216 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3216 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3216 are further described hereinbelow with reference to Table 1.

[44994] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3216 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[44995] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3217 (VGAM3217) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[44996] VGAM3217 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3217 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[44997] VGAM3217 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3217 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[44998] VGAM3217 gene, herein designated VGAM GENE, encodes a VGAM3217 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3217 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3217 precursor RNA is designated SEQ ID:72688, and is provided hereinbelow with reference to the sequence listing part.

[44999] VGAM3217 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3217 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45000] An enzyme complex designated DICER COMPLEX, dices the VGAM3217 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3217 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3217 RNA is designated SEQ ID:72689, and is provided hereinbelow with reference to the sequence listing part.

[45001] VGAM3217 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3217 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3217 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45002] VGAM3217 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3217 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3217 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3217 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3217 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45003] The complementary binding of VGAM3217 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3217 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3217 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3217 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45004] It is appreciated that VGAM3217 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3217 host target genes. The mRNA of each one of this plurality of VGAM3217 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3217 RNA, herein designated VGAM RNA, and which when bound by VGAM3217 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3217 host target proteins.

[45005] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3217 gene, herein designated VGAM GENE, on one or more VGAM3217 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45006] It is yet further appreciated that a function of VGAM3217 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3217 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3217 correlate with, and may be deduced from, the identity of the host target genes which VGAM3217 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45007] Nucleotide sequences of the VGAM3217 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3217 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3217 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3217 are further described hereinbelow with reference to Table 1.

[45008] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3217 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45009] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3218 (VGAM3218) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45010] VGAM3218 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3218 was detected is described hereinabove with reference to Figs. 2-8.

[45011] VGAM3218 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3218 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45012] VGAM3218 gene, herein designated VGAM GENE, encodes a VGAM3218 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3218 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3218 precursor RNA is designated SEQ ID:72697, and is provided hereinbelow with reference to the sequence listing part.

[45013] VGAM3218 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3218 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[45014] An enzyme complex designated DICER COMPLEX, dices the VGAM3218 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3218 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3218 RNA is designated SEQ ID:72698, and is provided hereinbelow with reference to the sequence listing part.

[45015] VGAM3218 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3218 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3218 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45016] VGAM3218 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3218 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3218 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3218 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3218 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45017] The complementary binding of VGAM3218 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3218 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3218 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3218 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45018] It is appreciated that VGAM3218 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3218 host target genes. The mRNA of each one of this plurality of VGAM3218 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3218 RNA, herein designated VGAM RNA, and which when bound by VGAM3218 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3218 host target proteins.

[45019] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3218 gene, herein designated VGAM GENE, on one or more VGAM3218 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45020] It is yet further appreciated that a function of VGAM3218 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3218 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3218 correlate with, and may be deduced from, the identity of the host target genes which VGAM3218 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45021] Nucleotide sequences of the VGAM3218 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3218 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3218 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3218 are further described hereinbelow with reference to Table 1.

[45022] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3218 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45023] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3219 (VGAM3219) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45024] VGAM3219 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3219 was detected is described hereinabove with reference to Figs. 2-8.

[45025] VGAM3219 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Human papillomavirus type 47. VGAM3219 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45026] VGAM3219 gene, herein designated VGAM GENE, encodes a VGAM3219 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3219 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3219 precursor RNA is designated SEQ ID:72725, and is provided hereinbelow with reference to the sequence listing part.

[45027] VGAM3219 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3219 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45028] An enzyme complex designated DICER COMPLEX, dices the VGAM3219 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3219 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3219 RNA is designated SEQ ID:72726, and is provided hereinbelow with reference to the sequence listing part.

[45029] VGAM3219 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3219 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3219 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45030] VGAM3219 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3219 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3219 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3219 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3219 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45031] The complementary binding of VGAM3219 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3219 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3219 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3219 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45032] It is appreciated that VGAM3219 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3219 host target genes. The mRNA of each one of this plurality of VGAM3219 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3219 RNA, herein designated VGAM RNA, and which when bound by VGAM3219 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3219 host target proteins.

[45033] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3219 gene, herein designated VGAM GENE, on one or more VGAM3219 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45034] It is yet further appreciated that a function of VGAM3219 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3219 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 47. Specific functions, and accordingly utilities, of VGAM3219 correlate with, and may be deduced from, the identity of the host target genes which VGAM3219 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45035] Nucleotide sequences of the VGAM3219 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3219 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3219 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3219 are further described hereinbelow with reference to Table 1.

[45036] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3219 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45037] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3220 (VGAM3220) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45038] VGAM3220 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3220 was detected is described hereinabove with reference to Figs. 2-8.

[45039] VGAM3220 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus

type 12. VGAM3220 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45040] VGAM3220 gene, herein designated VGAM GENE, encodes a VGAM3220 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3220 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3220 precursor RNA is designated SEQ ID:72729, and is provided hereinbelow with reference to the sequence listing part.

[45041] VGAM3220 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3220 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45042] An enzyme complex designated DICER COMPLEX, dices

the VGAM3220 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3220 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3220 RNA is designated SEQ ID:72730, and is provided hereinbelow with reference to the sequence listing part.

[45043] VGAM3220 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3220 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3220 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45044] VGAM3220 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3220 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3220 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3220 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3220 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45045] The complementary binding of VGAM3220 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3220 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3220 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3220 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45046] It is appreciated that VGAM3220 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3220 host target genes. The mRNA of each one of this plurality of VGAM3220 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3220 RNA, herein designated VGAM RNA, and which when bound by VGAM3220 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3220 host target proteins.

[45047] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3220 gene, herein designated VGAM GENE, on one or more VGAM3220 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45048] It is yet further appreciated that a function of VGAM3220 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3220 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 12. Specific functions, and accordingly utilities, of VGAM3220 correlate with, and may be deduced from, the identity of the host target genes which VGAM3220 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45049] Nucleotide sequences of the VGAM3220 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3220 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3220 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3220 are further described hereinbelow with reference to Table 1.

[45050] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3220 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45051] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3221 (VGAM3221) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45052] VGAM3221 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3221 was detected is described hereinabove with reference to Figs. 2-8.

[45053] VGAM3221 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 13. VGAM3221 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45054] VGAM3221 gene, herein designated VGAM GENE, encodes a VGAM3221 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3221 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3221 precursor RNA is designated SEQ ID:72740, and is provided hereinbelow with reference to the sequence listing part.

[45055] VGAM3221 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3221 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45056] An enzyme complex designated DICER COMPLEX, dices the VGAM3221 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3221 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3221 RNA is designated SEQ ID:72741, and is provided hereinbelow with reference to the sequence listing part.

[45057] VGAM3221 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3221 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3221 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45058] VGAM3221 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3221 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3221 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3221 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3221 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45059] The complementary binding of VGAM3221 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3221 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3221

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3221 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45060] It is appreciated that VGAM3221 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3221 host target genes. The mRNA of each one of this plurality of VGAM3221 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3221 RNA, herein designated VGAM RNA, and which when bound by VGAM3221 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3221 host target proteins.

[45061] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3221 gene, herein designated VGAM GENE, on one or more VGAM3221 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45062] It is yet further appreciated that a function of VGAM3221 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3221 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 13. Specific functions, and accordingly utilities, of VGAM3221 correlate with, and may be deduced from, the identity of the host target genes which VGAM3221 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45063] Nucleotide sequences of the VGAM3221 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3221 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3221 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3221 are further described hereinbelow with reference to Table 1.

[45064] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3221 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45065] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3222 (VGAM3222) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45066] VGAM3222 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3222 was detected is described hereinabove with reference to Figs. 2-8.

[45067] VGAM3222 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus D. VGAM3222 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[45068] VGAM3222 gene, herein designated VGAM GENE, encodes a VGAM3222 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3222 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3222 precursor RNA is designated SEQ ID:72762, and is provided hereinbelow with reference to the sequence listing part.

[45069] VGAM3222 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3222 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45070] An enzyme complex designated DICER COMPLEX, dices the VGAM3222 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3222 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3222 RNA is designated SEQ ID:72763, and is provided hereinbelow with reference to the sequence listing part.

[45071] VGAM3222 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3222 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3222 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45072] VGAM3222 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3222 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3222 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3222 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3222 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45073] The complementary binding of VGAM3222 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3222 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3222 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3222 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45074] It is appreciated that VGAM3222 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3222 host target genes. The mRNA of each one of this plurality of VGAM3222 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3222 RNA, herein designated VGAM RNA, and which when bound by VGAM3222 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3222 host target proteins.

[45075] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3222 gene, herein designated VGAM GENE, on one or more VGAM3222 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45076] It is yet further appreciated that a function of VGAM3222 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3222 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus D. Specific functions, and accordingly utilities, of VGAM3222 correlate with, and may be deduced from, the identity of the host target genes which VGAM3222 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45077] Nucleotide sequences of the VGAM3222 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3222 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3222 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3222 are further

described hereinbelow with reference to Table 1.

[45078] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3222 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45079] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3223 (VGAM3223) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45080] VGAM3223 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3223 was detected is described hereinabove with reference to Figs. 2-8.

[45081] VGAM3223 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus D. VGAM3223 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45082] VGAM3223 gene, herein designated VGAM GENE, encodes a VGAM3223 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3223 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3223 precursor RNA is designated SEQ ID:72777, and is provided hereinbelow with reference to the sequence listing part.

[45083] VGAM3223 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3223 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45084] An enzyme complex designated DICER COMPLEX, dices the VGAM3223 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3223 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3223 RNA is designated SEQ ID:72778, and is provided hereinbelow with reference to the sequence listing part.

[45085] VGAM3223 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3223 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3223 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45086] VGAM3223 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3223 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3223 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3223 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3223 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45087] The complementary binding of VGAM3223 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3223 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3223 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3223 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45088] It is appreciated that VGAM3223 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3223 host target genes. The mRNA of each one of this plurality of VGAM3223 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3223 RNA, herein designated VGAM RNA, and which when bound by VGAM3223 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3223 host target proteins.

[45089] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3223 gene, herein designated VGAM GENE, on one or more VGAM3223 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45090] It is yet further appreciated that a function of VGAM3223 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3223 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus D. Specific functions, and accordingly utilities, of VGAM3223 correlate with, and may be deduced from, the identity of the host target genes which VGAM3223 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45091] Nucleotide sequences of the VGAM3223 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3223 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3223 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3223 are further described hereinbelow with reference to Table 1.

[45092] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3223 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45093] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3224 (VGAM3224) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45094] VGAM3224 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3224 was detected is described hereinabove with reference to Figs. 2-8.

[45095] VGAM3224 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 22. VGAM3224 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45096] VGAM3224 gene, herein designated VGAM GENE, encodes

a VGAM3224 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3224 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3224 precursor RNA is designated SEQ ID:72785, and is provided hereinbelow with reference to the sequence listing part.

[45097] VGAM3224 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3224 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45098] An enzyme complex designated DICER COMPLEX, dices the VGAM3224 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3224 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3224 RNA is designated SEQ ID:72786, and is provided hereinbelow with reference to the sequence listing part.

[45099] VGAM3224 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3224 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3224 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45100] VGAM3224 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3224 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3224 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3224 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3224 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45101] The complementary binding of VGAM3224 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3224 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3224 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3224 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[45102] It is appreciated that VGAM3224 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3224 host target genes. The mRNA of each one of this plurality of VGAM3224 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3224 RNA, herein designated VGAM RNA, and which when bound by VGAM3224 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3224 host target proteins.

[45103] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3224 gene, herein designated VGAM GENE, on one or more VGAM3224 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45104] It is yet further appreciated that a function of VGAM3224 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3224 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 22. Specific functions, and accordingly utilities, of VGAM3224 correlate with, and may be deduced from, the identity of the host target genes which VGAM3224 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45105] Nucleotide sequences of the VGAM3224 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3224 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3224 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3224 are further described hereinbelow with reference to Table 1.

[45106] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3224 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45107] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3225 (VGAM3225) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45108] VGAM3225 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3225 was detected is described hereinabove with reference to Figs. 2-8.

[45109] VGAM3225 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3225 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45110] VGAM3225 gene, herein designated VGAM GENE, encodes a VGAM3225 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3225 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3225 precursor RNA is designated SEQ ID:72795, and is provided hereinbelow with reference to the sequence listing part.

[45111] VGAM3225 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3225 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45112] An enzyme complex designated DICER COMPLEX, dices the VGAM3225 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3225 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3225 RNA is designated SEQ ID:72796, and is provided hereinbelow with reference to the sequence listing part.

[45113] VGAM3225 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3225 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3225 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45114] VGAM3225 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3225 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3225 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3225 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3225 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45115] The complementary binding of VGAM3225 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3225 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3225 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3225 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45116] It is appreciated that VGAM3225 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3225 host target genes. The mRNA of each one of this plurality of VGAM3225 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3225 RNA, herein designated VGAM RNA, and which when bound by VGAM3225 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3225 host target proteins.

[45117] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3225 gene, herein designated VGAM GENE, on one or more VGAM3225 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45118] It is yet further appreciated that a function of VGAM3225 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3225 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3225 correlate with, and may be deduced from, the identity of the host target genes which VGAM3225 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45119] Nucleotide sequences of the VGAM3225 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3225 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3225 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3225 are further described hereinbelow with reference to Table 1.

[45120] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3225 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45121] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3226 (VGAM3226) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45122] VGAM3226 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3226 was detected is described hereinabove with reference to Figs. 2-8.

[45123] VGAM3226 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3226 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45124] VGAM3226 gene, herein designated VGAM GENE, encodes a VGAM3226 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3226 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3226 precursor RNA is designated SEQ ID:72903, and is provided hereinbelow with reference to the sequence listing part.

[45125] VGAM3226 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3226 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45126] An enzyme complex designated DICER COMPLEX, dices the VGAM3226 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3226 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3226 RNA is designated SEQ ID:72904, and is provided hereinbelow with reference to the sequence listing part.

[45127] VGAM3226 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3226 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3226 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45128] VGAM3226 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3226 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3226 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3226 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3226 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45129] The complementary binding of VGAM3226 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3226 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3226 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3226 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45130] It is appreciated that VGAM3226 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3226 host target genes. The mRNA of each one of this plurality of VGAM3226 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3226 RNA, herein designated VGAM RNA, and which when bound by VGAM3226 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3226 host target proteins.

[45131] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3226 gene, herein designated VGAM GENE, on one or more VGAM3226 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45132] It is yet further appreciated that a function of VGAM3226 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3226 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3226 correlate with, and may be deduced from, the identity of the host target genes which VGAM3226 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45133] Nucleotide sequences of the VGAM3226 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3226 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3226 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3226 are further described hereinbelow with reference to Table 1.

[45134] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3226 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45135] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3227 (VGAM3227) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45136] VGAM3227 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3227 was detected is described hereinabove with reference to Figs. 2–8.

[45137] VGAM3227 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3. VGAM3227 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45138] VGAM3227 gene, herein designated VGAM GENE, encodes a VGAM3227 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3227 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3227 precursor RNA is designated SEQ ID:72911, and is provided hereinbelow with reference to the sequence listing part.

[45139] VGAM3227 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3227 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45140] An enzyme complex designated DICER COMPLEX, dices the VGAM3227 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3227 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3227 RNA is designated SEQ ID:72912, and is provided hereinbelow with reference to the sequence listing part.

[45141] VGAM3227 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3227 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3227 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45142] VGAM3227 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3227 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3227 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3227 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3227 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45143] The complementary binding of VGAM3227 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3227 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3227 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3227 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45144] It is appreciated that VGAM3227 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3227 host target genes. The mRNA of each one of this plurality of VGAM3227 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3227 RNA, herein designated VGAM RNA, and which when bound by VGAM3227 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3227 host target proteins.

[45145] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3227 gene, herein designated VGAM GENE, on one or more VGAM3227 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[45146] It is yet further appreciated that a function of VGAM3227 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3227 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3227 correlate with, and may be deduced from, the identity of the host target genes which VGAM3227 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45147] Nucleotide sequences of the VGAM3227 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3227 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3227 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3227 are further described hereinbelow with reference to Table 1.

[45148] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3227 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45149] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3228 (VGAM3228) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45150] VGAM3228 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3228 was detected is described hereinabove with reference to Figs. 2-8.

[45151] VGAM3228 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3228 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45152] VGAM3228 gene, herein designated VGAM GENE, encodes a VGAM3228 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3228 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3228 precursor RNA is designated SEQ ID:72920, and is provided hereinbelow with reference to the sequence listing part.

[45153] VGAM3228 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3228 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45154] An enzyme complex designated DICER COMPLEX, dices the VGAM3228 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3228 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3228 RNA is designated SEQ ID:72921, and is provided hereinbelow with reference to the sequence listing part.

[45155] VGAM3228 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3228 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3228 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45156] VGAM3228 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3228 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3228 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3228 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3228 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45157] The complementary binding of VGAM3228 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3228 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3228 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3228 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45158] It is appreciated that VGAM3228 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3228 host target genes. The mRNA of

each one of this plurality of VGAM3228 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3228 RNA, herein designated VGAM RNA, and which when bound by VGAM3228 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3228 host target proteins.

[45159] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3228 gene, herein designated VGAM GENE, on one or more VGAM3228 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[45160] It is yet further appreciated that a function of VGAM3228 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3228 include diagnosis, prevention and treatment of viral infection by *Paramecium bursaria* Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3228 correlate with, and may be deduced from, the identity of the host target genes which VGAM3228 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45161] Nucleotide sequences of the VGAM3228 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3228 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3228 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3228 are further described hereinbelow with reference to Table 1.

[45162] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3228 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[45163] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3229 (VGAM3229) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45164] VGAM3229 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3229 was detected is described hereinabove with reference to Figs. 2–8.

[45165] VGAM3229 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Swinepox virus. VGAM3229 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45166] VGAM3229 gene, herein designated VGAM GENE, encodes a VGAM3229 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3229 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3229 precursor RNA is designated SEQ ID:72927, and is provided hereinbelow with reference to the sequence listing part.

[45167] VGAM3229 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3229 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45168] An enzyme complex designated DICER COMPLEX, dices the VGAM3229 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3229 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3229 RNA is designated SEQ ID:72928,

and is provided hereinbelow with reference to the sequence listing part.

[45169] VGAM3229 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3229 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3229 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45170] VGAM3229 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3229 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3229 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3229 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3229 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45171] The complementary binding of VGAM3229 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3229 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3229 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3229 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45172] It is appreciated that VGAM3229 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3229 host target genes. The mRNA of each one of this plurality of VGAM3229 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3229 RNA, herein designated VGAM RNA, and which when bound by VGAM3229 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3229 host target proteins.

[45173] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3229 gene, herein designated VGAM GENE, on one or more VGAM3229 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45174] It is yet further appreciated that a function of VGAM3229 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3229 include diagnosis, prevention and treatment of viral infection by Swinepox virus. Specific functions, and accordingly utilities, of VGAM3229 correlate with, and may be deduced from, the identity of the host target genes which VGAM3229 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45175] Nucleotide sequences of the VGAM3229 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3229 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3229 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3229 are further described hereinbelow with reference to Table 1.

[45176] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3229 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45177] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3230 (VGAM3230) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45178] VGAM3230 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3230 was detected is described hereinabove with reference to Figs. 2–8.

[45179] VGAM3230 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 36. VGAM3230 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45180] VGAM3230 gene, herein designated VGAM GENE, encodes a VGAM3230 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3230 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3230 precu-

sor RNA is designated SEQ ID:72931, and is provided hereinbelow with reference to the sequence listing part.

[45181] VGAM3230 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3230 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45182] An enzyme complex designated DICER COMPLEX, dices the VGAM3230 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3230 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3230 RNA is designated SEQ ID:72932, and is provided hereinbelow with reference to the se-

quence listing part.

[45183] VGAM3230 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3230 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3230 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45184] VGAM3230 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3230 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3230 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3230 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3230 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45185] The complementary binding of VGAM3230 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3230 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3230 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3230 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45186] It is appreciated that VGAM3230 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3230 host target genes. The mRNA of each one of this plurality of VGAM3230 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3230 RNA, herein designated VGAM RNA, and which when bound by VGAM3230 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3230 host target proteins.

[45187] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3230 gene, herein designated VGAM GENE, on one or more VGAM3230 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45188] It is yet further appreciated that a function of VGAM3230

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3230 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 36. Specific functions, and accordingly utilities, of VGAM3230 correlate with, and may be deduced from, the identity of the host target genes which VGAM3230 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45189] Nucleotide sequences of the VGAM3230 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3230 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3230 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3230 are further described hereinbelow with reference to Table 1.

[45190] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3230 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45191] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3231 (VGAM3231) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45192] VGAM3231 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3231 was detected is described hereinabove with reference to Figs. 2–8.

[45193] VGAM3231 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 36. VGAM3231 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45194] VGAM3231 gene, herein designated VGAM GENE, encodes a VGAM3231 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3231 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3231 precursor RNA is designated SEQ ID:72941, and is provided

hereinbelow with reference to the sequence listing part.

[45195] VGAM3231 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3231 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45196] An enzyme complex designated DICER COMPLEX, dices the VGAM3231 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3231 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3231 RNA is designated SEQ ID:72942, and is provided hereinbelow with reference to the sequence listing part.

[45197] VGAM3231 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3231 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3231 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45198] VGAM3231 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3231 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3231 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3231 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3231 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45199] The complementary binding of VGAM3231 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3231 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3231 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3231 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45200] It is appreciated that VGAM3231 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3231 host target genes. The mRNA of each one of this plurality of VGAM3231 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3231 RNA, herein designated VGAM RNA, and which when bound by VGAM3231 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3231 host target proteins.

[45201] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3231 gene, herein designated VGAM GENE, on one or more VGAM3231 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45202] It is yet further appreciated that a function of VGAM3231 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3231 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 36. Specific functions, and accordingly utilities, of VGAM3231 correlate with, and may be deduced from, the identity of the host target genes which VGAM3231 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45203] Nucleotide sequences of the VGAM3231 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3231 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3231 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3231 are further described hereinbelow with reference to Table 1.

[45204] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3231 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45205] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3232 (VGAM3232) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45206] VGAM3232 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3232 was detected is described hereinabove with reference to Figs. 2–8.

[45207] VGAM3232 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6B. VGAM3232 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45208] VGAM3232 gene, herein designated VGAM GENE, encodes a VGAM3232 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3232 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3232 precursor RNA is designated SEQ ID:72949, and is provided hereinbelow with reference to the sequence listing part.

[45209] VGAM3232 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3232 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45210] An enzyme complex designated DICER COMPLEX, dices the VGAM3232 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3232 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3232 RNA is designated SEQ ID:72950, and is provided hereinbelow with reference to the sequence listing part.

[45211] VGAM3232 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3232 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3232 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45212] VGAM3232 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3232 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3232 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3232 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3232 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45213] The complementary binding of VGAM3232 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3232 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3232 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3232 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45214] It is appreciated that VGAM3232 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3232 host target genes. The mRNA of each one of this plurality of VGAM3232 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3232 RNA, herein designated VGAM

RNA, and which when bound by VGAM3232 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3232 host target proteins.

[45215] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3232 gene, herein designated VGAM GENE, on one or more VGAM3232 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45216] It is yet further appreciated that a function of VGAM3232 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3232 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6B. Specific functions, and accordingly utilities, of VGAM3232 correlate with, and may be deduced from, the identity of the host target genes which VGAM3232 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45217] Nucleotide sequences of the VGAM3232 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3232 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3232 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3232 are further described hereinbelow with reference to Table 1.

[45218] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3232 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45219] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3233 (VGAM3233) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45220] VGAM3233 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3233 was detected is described hereinabove with reference to Figs. 2-8.

[45221] VGAM3233 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus. VGAM3233 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45222] VGAM3233 gene, herein designated VGAM GENE, encodes a VGAM3233 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3233 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3233 precursor RNA is designated SEQ ID:73006, and is provided hereinbelow with reference to the sequence listing part.

[45223] VGAM3233 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3233 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45224] An enzyme complex designated DICER COMPLEX, dices the VGAM3233 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3233 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3233 RNA is designated SEQ ID:73007, and is provided hereinbelow with reference to the sequence listing part.

[45225] VGAM3233 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3233 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3233 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45226] VGAM3233 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3233 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3233 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3233 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3233 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45227] The complementary binding of VGAM3233 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3233 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3233 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3233 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45228] It is appreciated that VGAM3233 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3233 host target genes. The mRNA of each one of this plurality of VGAM3233 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3233 RNA, herein designated VGAM RNA, and which when bound by VGAM3233 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3233 host target proteins.

[45229] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3233 gene, herein designated VGAM GENE, on one or more VGAM3233 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45230] It is yet further appreciated that a function of VGAM3233 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3233 include diagnosis, prevention and

treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3233 correlate with, and may be deduced from, the identity of the host target genes which VGAM3233 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45231] Nucleotide sequences of the VGAM3233 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3233 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3233 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3233 are further described hereinbelow with reference to Table 1.

[45232] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3233 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45233] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3234 (VGAM3234) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45234] VGAM3234 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3234 was detected is described hereinabove with reference to Figs. 2–8.

[45235] VGAM3234 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cricket paralysis virus. VGAM3234 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45236] VGAM3234 gene, herein designated VGAM GENE, encodes a VGAM3234 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3234 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3234 precursor RNA is designated SEQ ID:73009, and is provided hereinbelow with reference to the sequence listing part.

[45237] VGAM3234 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3234 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45238] An enzyme complex designated DICER COMPLEX, dices the VGAM3234 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3234 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3234 RNA is designated SEQ ID:73010, and is provided hereinbelow with reference to the sequence listing part.

[45239] VGAM3234 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3234 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3234 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45240] VGAM3234 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3234 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3234 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3234 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3234 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45241] The complementary binding of VGAM3234 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3234 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3234 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3234 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45242] It is appreciated that VGAM3234 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3234 host target genes. The mRNA of each one of this plurality of VGAM3234 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3234 RNA, herein designated VGAM RNA, and which when bound by VGAM3234 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3234 host target proteins.

[45243] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3234 gene, herein designated VGAM GENE, on one or more VGAM3234 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45244] It is yet further appreciated that a function of VGAM3234 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3234 include diagnosis, prevention and treatment of viral infection by Cricket paralysis virus. Spe-

cific functions, and accordingly utilities, of VGAM3234 correlate with, and may be deduced from, the identity of the host target genes which VGAM3234 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45245] Nucleotide sequences of the VGAM3234 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3234 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3234 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3234 are further described hereinbelow with reference to Table 1.

[45246] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3234 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45247] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3235 (VGAM3235) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[45248] VGAM3235 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3235 was detected is described hereinabove with reference to Figs. 2–8.

[45249] VGAM3235 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3235 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45250] VGAM3235 gene, herein designated VGAM GENE, encodes a VGAM3235 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3235 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3235 precursor RNA is designated SEQ ID:73037, and is provided hereinbelow with reference to the sequence listing part.

[45251] VGAM3235 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3235 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45252] An enzyme complex designated DICER COMPLEX, dices the VGAM3235 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3235 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3235 RNA is designated SEQ ID:73038, and is provided hereinbelow with reference to the sequence listing part.

[45253] VGAM3235 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3235 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3235 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45254] VGAM3235 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3235 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3235 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3235 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3235 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45255] The complementary binding of VGAM3235 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3235 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3235 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3235 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45256] It is appreciated that VGAM3235 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3235 host target genes. The mRNA of each one of this plurality of VGAM3235 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3235 RNA, herein designated VGAM RNA, and which when bound by VGAM3235 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3235 host target proteins.

[45257] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3235 gene, herein designated VGAM GENE, on one or more VGAM3235 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45258] It is yet further appreciated that a function of VGAM3235 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3235 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of

VGAM3235 correlate with, and may be deduced from, the identity of the host target genes which VGAM3235 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45259] Nucleotide sequences of the VGAM3235 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3235 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3235 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3235 are further described hereinbelow with reference to Table 1.

[45260] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3235 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45261] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3236 (VGAM3236) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[45262] VGAM3236 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3236 was detected is described hereinabove with reference to Figs. 2–8.

[45263] VGAM3236 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3236 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45264] VGAM3236 gene, herein designated VGAM GENE, encodes a VGAM3236 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3236 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3236 precursor RNA is designated SEQ ID:73115, and is provided hereinbelow with reference to the sequence listing part.

[45265] VGAM3236 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3236 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45266] An enzyme complex designated DICER COMPLEX, dices the VGAM3236 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3236 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3236 RNA is designated SEQ ID:73116, and is provided hereinbelow with reference to the sequence listing part.

[45267] VGAM3236 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3236 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3236 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45268] VGAM3236 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3236 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3236 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3236 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3236 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45269] The complementary binding of VGAM3236 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3236 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3236 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3236 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45270] It is appreciated that VGAM3236 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3236 host target genes. The mRNA of each one of this plurality of VGAM3236 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3236 RNA, herein designated VGAM RNA, and which when bound by VGAM3236 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3236 host target proteins.

[45271] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3236 gene, herein designated VGAM GENE, on one or more VGAM3236 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45272] It is yet further appreciated that a function of VGAM3236 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3236 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3236 correlate with, and may be deduced from, the

identity of the host target genes which VGAM3236 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45273] Nucleotide sequences of the VGAM3236 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3236 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3236 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3236 are further described hereinbelow with reference to Table 1.

[45274] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3236 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45275] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3237 (VGAM3237) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45276] VGAM3237 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3237 was detected is described hereinabove with reference to Figs. 2–8.

[45277] VGAM3237 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Murine adenovirus A. VGAM3237 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45278] VGAM3237 gene, herein designated VGAM GENE, encodes a VGAM3237 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3237 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3237 precursor RNA is designated SEQ ID:73131, and is provided hereinbelow with reference to the sequence listing part.

[45279] VGAM3237 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3237 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45280] An enzyme complex designated DICER COMPLEX, dices the VGAM3237 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3237 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3237 RNA is designated SEQ ID:73132, and is provided hereinbelow with reference to the sequence listing part.

[45281] VGAM3237 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3237 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3237 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45282] VGAM3237 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3237 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3237 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3237 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3237 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45283] The complementary binding of VGAM3237 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3237 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3237 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3237 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45284] It is appreciated that VGAM3237 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3237 host target genes. The mRNA of each one of this plurality of VGAM3237 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3237 RNA, herein designated VGAM RNA, and which when bound by VGAM3237 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3237 host target proteins.

[45285] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3237 gene, herein designated VGAM GENE, on one or more VGAM3237 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45286] It is yet further appreciated that a function of VGAM3237 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3237 include diagnosis, prevention and treatment of viral infection by Murine adenovirus A. Specific functions, and accordingly utilities, of VGAM3237 correlate with, and may be deduced from, the identity of the host target genes which VGAM3237 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[45287] Nucleotide sequences of the VGAM3237 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3237 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3237 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3237 are further described hereinbelow with reference to Table 1.

[45288] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3237 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45289] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3238 (VGAM3238) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45290] VGAM3238 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3238 was detected is described hereinabove with reference to Figs. 2–8.

[45291] VGAM3238 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3238 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45292] VGAM3238 gene, herein designated VGAM GENE, encodes a VGAM3238 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3238 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3238 precursor RNA is designated SEQ ID:73209, and is provided hereinbelow with reference to the sequence listing part.

[45293] VGAM3238 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3238 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45294] An enzyme complex designated DICER COMPLEX, dices the VGAM3238 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3238 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3238 RNA is designated SEQ ID:73210, and is provided hereinbelow with reference to the sequence listing part.

[45295] VGAM3238 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3238 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3238 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45296] VGAM3238 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3238 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3238 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3238 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3238 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[45297] The complementary binding of VGAM3238 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3238 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3238 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3238 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45298] It is appreciated that VGAM3238 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3238 host target genes. The mRNA of each one of this plurality of VGAM3238 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3238 RNA, herein designated VGAM RNA, and which when bound by VGAM3238 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3238 host target proteins.

[45299] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3238 gene, herein designated VGAM GENE, on one or more VGAM3238 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45300] It is yet further appreciated that a function of VGAM3238 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3238 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3238 correlate with, and may be deduced from, the identity of the host target genes which VGAM3238 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[45301] Nucleotide sequences of the VGAM3238 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3238 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3238 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3238 are further described hereinbelow with reference to Table 1.

[45302] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3238 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45303] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3239 (VGAM3239) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45304] VGAM3239 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3239 was detected is described hereinabove with reference to Figs. 2–8.

[45305] VGAM3239 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3239 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45306] VGAM3239 gene, herein designated VGAM GENE, encodes a VGAM3239 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3239 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3239 precursor RNA is designated SEQ ID:73227, and is provided hereinbelow with reference to the sequence listing part.

[45307] VGAM3239 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3239 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45308] An enzyme complex designated DICER COMPLEX, dices the VGAM3239 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3239 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3239 RNA is designated SEQ ID:73228, and is provided hereinbelow with reference to the sequence listing part.

[45309] VGAM3239 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3239 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3239 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[45310] VGAM3239 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3239 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3239 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3239 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3239 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45311] The complementary binding of VGAM3239 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3239 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3239 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3239 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45312] It is appreciated that VGAM3239 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3239 host target genes. The mRNA of each one of this plurality of VGAM3239 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3239 RNA, herein designated VGAM RNA, and which when bound by VGAM3239 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3239 host target proteins.

[45313] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3239 gene, herein designated VGAM GENE, on one

or more VGAM3239 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45314] It is yet further appreciated that a function of VGAM3239 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3239 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3239 correlate with, and may be deduced from, the identity of the host target genes which VGAM3239 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45315] Nucleotide sequences of the VGAM3239 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3239 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3239 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3239 are further described hereinbelow with reference to Table 1.

[45316] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3239 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45317] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3240 (VGAM3240) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45318] VGAM3240 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3240 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[45319] VGAM3240 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3240 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45320] VGAM3240 gene, herein designated VGAM GENE, encodes a VGAM3240 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3240 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3240 precursor RNA is designated SEQ ID:73263, and is provided hereinbelow with reference to the sequence listing part.

[45321] VGAM3240 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3240 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45322] An enzyme complex designated DICER COMPLEX, dices the VGAM3240 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3240 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3240 RNA is designated SEQ ID:73264, and is provided hereinbelow with reference to the sequence listing part.

[45323] VGAM3240 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3240 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3240 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45324] VGAM3240 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3240 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3240 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3240 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3240 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45325] The complementary binding of VGAM3240 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3240 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3240 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3240 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45326] It is appreciated that VGAM3240 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3240 host target genes. The mRNA of each one of this plurality of VGAM3240 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3240 RNA, herein designated VGAM RNA, and which when bound by VGAM3240 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3240 host target proteins.

[45327] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3240 gene, herein designated VGAM GENE, on one or more VGAM3240 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45328] It is yet further appreciated that a function of VGAM3240 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3240 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3240 correlate with, and may be deduced from, the identity of the host target genes which VGAM3240 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45329] Nucleotide sequences of the VGAM3240 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3240 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3240 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3240 are further described hereinbelow with reference to Table 1.

[45330] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3240 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45331] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3241 (VGAM3241) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45332] VGAM3241 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3241 was detected is described hereinabove with reference to Figs. 2-8.

[45333] VGAM3241 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3241 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45334] VGAM3241 gene, herein designated VGAM GENE, encodes a VGAM3241 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3241 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3241 precursor RNA is designated SEQ ID:73271, and is provided hereinbelow with reference to the sequence listing part.

[45335] VGAM3241 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3241 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[45336] An enzyme complex designated DICER COMPLEX, dices the VGAM3241 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3241 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3241 RNA is designated SEQ ID:73272, and is provided hereinbelow with reference to the sequence listing part.

[45337] VGAM3241 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3241 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3241 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45338] VGAM3241 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3241 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3241 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3241 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3241 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45339] The complementary binding of VGAM3241 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3241 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3241 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3241 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45340] It is appreciated that VGAM3241 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3241 host target genes. The mRNA of each one of this plurality of VGAM3241 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3241 RNA, herein designated VGAM RNA, and which when bound by VGAM3241 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3241 host target proteins.

[45341] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3241 gene, herein designated VGAM GENE, on one or more VGAM3241 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45342] It is yet further appreciated that a function of VGAM3241 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3241 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3241 correlate with, and may be deduced from, the identity of the host target genes which VGAM3241 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45343] Nucleotide sequences of the VGAM3241 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3241 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3241 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3241 are further described hereinbelow with reference to Table 1.

[45344] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3241 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45345] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3242 (VGAM3242) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45346] VGAM3242 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3242 was detected is described hereinabove with reference to Figs. 2-8.

[45347] VGAM3242 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Transmissible gastroenteritis virus. VGAM3242 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45348] VGAM3242 gene, herein designated VGAM GENE, encodes a VGAM3242 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3242 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3242 precursor RNA is designated SEQ ID:73283, and is provided hereinbelow with reference to the sequence listing part.

[45349] VGAM3242 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3242 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45350] An enzyme complex designated DICER COMPLEX, dices the VGAM3242 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3242 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3242 RNA is designated SEQ ID:73284, and is provided hereinbelow with reference to the sequence listing part.

[45351] VGAM3242 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3242 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3242 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45352] VGAM3242 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3242 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3242 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3242 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3242 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45353] The complementary binding of VGAM3242 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3242 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3242 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3242 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45354] It is appreciated that VGAM3242 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3242 host target genes. The mRNA of each one of this plurality of VGAM3242 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3242 RNA, herein designated VGAM RNA, and which when bound by VGAM3242 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3242 host target proteins.

[45355] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3242 gene, herein designated VGAM GENE, on one or more VGAM3242 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45356] It is yet further appreciated that a function of VGAM3242 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3242 include diagnosis, prevention and treatment of viral infection by Transmissible gastroenteritis virus. Specific functions, and accordingly utilities, of VGAM3242 correlate with, and may be deduced from, the identity of the host target genes which VGAM3242 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45357] Nucleotide sequences of the VGAM3242 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3242 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3242 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3242 are further described hereinbelow with reference to Table 1.

[45358] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3242 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45359] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3243 (VGAM3243) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45360] VGAM3243 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3243 was detected is described hereinabove with reference to Figs. 2-8.

[45361] VGAM3243 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3243 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45362] VGAM3243 gene, herein designated VGAM GENE, encodes a VGAM3243 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3243 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3243 precursor RNA is designated SEQ ID:73302, and is provided hereinbelow with reference to the sequence listing part.

[45363] VGAM3243 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3243 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45364] An enzyme complex designated DICER COMPLEX, dices

the VGAM3243 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3243 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3243 RNA is designated SEQ ID:73303, and is provided hereinbelow with reference to the sequence listing part.

[45365] VGAM3243 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3243 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3243 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45366] VGAM3243 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3243 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3243 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3243 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3243 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45367] The complementary binding of VGAM3243 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3243 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3243 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3243 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45368] It is appreciated that VGAM3243 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3243 host target genes. The mRNA of each one of this plurality of VGAM3243 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3243 RNA, herein designated VGAM RNA, and which when bound by VGAM3243 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3243 host target proteins.

[45369] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3243 gene, herein designated VGAM GENE, on one or more VGAM3243 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45370] It is yet further appreciated that a function of VGAM3243 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3243 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3243 correlate with, and may be deduced from, the identity of the host target genes which VGAM3243 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45371] Nucleotide sequences of the VGAM3243 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3243 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3243 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3243 are further described hereinbelow with reference to Table 1.

[45372] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3243 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45373] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3244 (VGAM3244) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45374] VGAM3244 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3244 was detected is described hereinabove with reference to Figs. 2-8.

[45375] VGAM3244 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3244 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[45376] VGAM3244 gene, herein designated VGAM GENE, encodes a VGAM3244 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3244 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3244 precursor RNA is designated SEQ ID:73306, and is provided hereinbelow with reference to the sequence listing part.

[45377] VGAM3244 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3244 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45378] An enzyme complex designated DICER COMPLEX, dices the VGAM3244 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3244 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3244 RNA is designated SEQ ID:73307, and is provided hereinbelow with reference to the sequence listing part.

[45379] VGAM3244 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3244 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3244 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45380] VGAM3244 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3244 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3244 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3244 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3244 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45381] The complementary binding of VGAM3244 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3244 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3244

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3244 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45382] It is appreciated that VGAM3244 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3244 host target genes. The mRNA of each one of this plurality of VGAM3244 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3244 RNA, herein designated VGAM RNA, and which when bound by VGAM3244 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3244 host target proteins.

[45383] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3244 gene, herein designated VGAM GENE, on one or more VGAM3244 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45384] It is yet further appreciated that a function of VGAM3244 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3244 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3244 correlate with, and may be deduced from, the identity of the host target genes which VGAM3244 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45385] Nucleotide sequences of the VGAM3244 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3244 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3244 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3244 are further described hereinbelow with reference to Table 1.

[45386] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3244 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45387] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3245 (VGAM3245) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45388] VGAM3245 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3245 was detected is described hereinabove with reference to Figs. 2-8.

[45389] VGAM3245 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3245 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene con-

tained in the human genome.

[45390] VGAM3245 gene, herein designated VGAM GENE, encodes a VGAM3245 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3245 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3245 precursor RNA is designated SEQ ID:73315, and is provided hereinbelow with reference to the sequence listing part.

[45391] VGAM3245 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3245 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45392] An enzyme complex designated DICER COMPLEX, dices the VGAM3245 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3245 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3245 RNA is designated SEQ ID:73316, and is provided hereinbelow with reference to the sequence listing part.

[45393] VGAM3245 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3245 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3245 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45394] VGAM3245 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3245 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3245 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3245 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3245 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45395] The complementary binding of VGAM3245 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3245 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3245 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3245 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45396] It is appreciated that VGAM3245 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3245 host target genes. The mRNA of each one of this plurality of VGAM3245 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3245 RNA, herein designated VGAM RNA, and which when bound by VGAM3245 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3245 host target proteins.

[45397] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3245 gene, herein designated VGAM GENE, on one or more VGAM3245 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45398] It is yet further appreciated that a function of VGAM3245 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3245 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3245 correlate with, and may be deduced from, the identity of the host target genes which VGAM3245 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45399] Nucleotide sequences of the VGAM3245 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3245 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3245 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3245 are further

described hereinbelow with reference to Table 1.

[45400] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3245 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45401] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3246 (VGAM3246) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45402] VGAM3246 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3246 was detected is described hereinabove with reference to Figs. 2-8.

[45403] VGAM3246 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Alcelaphine herpesvirus 1. VGAM3246 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45404] VGAM3246 gene, herein designated VGAM GENE, encodes a VGAM3246 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3246 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3246 precursor RNA is designated SEQ ID:73321, and is provided hereinbelow with reference to the sequence listing part.

[45405] VGAM3246 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3246 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45406] An enzyme complex designated DICER COMPLEX, dices the VGAM3246 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3246 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3246 RNA is designated SEQ ID:73322, and is provided hereinbelow with reference to the sequence listing part.

[45407] VGAM3246 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3246 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3246 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45408] VGAM3246 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3246 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3246 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3246 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3246 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45409] The complementary binding of VGAM3246 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3246 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3246 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3246 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45410] It is appreciated that VGAM3246 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3246 host target genes. The mRNA of each one of this plurality of VGAM3246 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3246 RNA, herein designated VGAM RNA, and which when bound by VGAM3246 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3246 host target proteins.

[45411] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3246 gene, herein designated VGAM GENE, on one or more VGAM3246 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45412] It is yet further appreciated that a function of VGAM3246 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3246 include diagnosis, prevention and treatment of viral infection by Alcelaphine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3246 correlate with, and may be deduced from, the identity of the host target genes which VGAM3246 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45413] Nucleotide sequences of the VGAM3246 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3246 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3246 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3246 are further described hereinbelow with reference to Table 1.

[45414] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3246 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45415] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3247 (VGAM3247) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45416] VGAM3247 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3247 was detected is described hereinabove with reference to Figs. 2-8.

[45417] VGAM3247 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Alcelaphine herpesvirus 1. VGAM3247 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45418] VGAM3247 gene, herein designated VGAM GENE, encodes

a VGAM3247 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3247 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3247 precursor RNA is designated SEQ ID:73337, and is provided hereinbelow with reference to the sequence listing part.

[45419] VGAM3247 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3247 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45420] An enzyme complex designated DICER COMPLEX, dices the VGAM3247 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3247 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3247 RNA is designated SEQ ID:73338, and is provided hereinbelow with reference to the sequence listing part.

[45421] VGAM3247 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3247 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3247 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45422] VGAM3247 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3247 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3247 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3247 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3247 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45423] The complementary binding of VGAM3247 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3247 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3247 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3247 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[45424] It is appreciated that VGAM3247 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3247 host target genes. The mRNA of each one of this plurality of VGAM3247 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3247 RNA, herein designated VGAM RNA, and which when bound by VGAM3247 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3247 host target proteins.

[45425] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3247 gene, herein designated VGAM GENE, on one or more VGAM3247 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45426] It is yet further appreciated that a function of VGAM3247 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3247 include diagnosis, prevention and treatment of viral infection by Alcelaphine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3247 correlate with, and may be deduced from, the identity of the host target genes which VGAM3247 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45427] Nucleotide sequences of the VGAM3247 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3247 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3247 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3247 are further described hereinbelow with reference to Table 1.

[45428] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3247 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45429] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3248 (VGAM3248) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45430] VGAM3248 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3248 was detected is described hereinabove with reference to Figs. 2-8.

[45431] VGAM3248 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3248 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45432] VGAM3248 gene, herein designated VGAM GENE, encodes a VGAM3248 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3248 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3248 precursor RNA is designated SEQ ID:73358, and is provided hereinbelow with reference to the sequence listing part.

[45433] VGAM3248 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3248 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45434] An enzyme complex designated DICER COMPLEX, dices the VGAM3248 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3248 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3248 RNA is designated SEQ ID:73359, and is provided hereinbelow with reference to the sequence listing part.

[45435] VGAM3248 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3248 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3248 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45436] VGAM3248 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3248 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3248 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3248 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3248 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45437] The complementary binding of VGAM3248 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3248 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3248 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3248 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45438] It is appreciated that VGAM3248 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3248 host target genes. The mRNA of each one of this plurality of VGAM3248 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3248 RNA, herein designated VGAM RNA, and which when bound by VGAM3248 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3248 host target proteins.

[45439] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3248 gene, herein designated VGAM GENE, on one or more VGAM3248 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45440] It is yet further appreciated that a function of VGAM3248 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3248 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3248 correlate with, and may be deduced from, the identity of the host target genes which VGAM3248 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45441] Nucleotide sequences of the VGAM3248 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3248 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3248 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3248 are further described hereinbelow with reference to Table 1.

[45442] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3248 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45443] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3249 (VGAM3249) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45444] VGAM3249 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3249 was detected is described hereinabove with reference to Figs. 2-8.

[45445] VGAM3249 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 90. VGAM3249 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45446] VGAM3249 gene, herein designated VGAM GENE, encodes a VGAM3249 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3249 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3249 precursor RNA is designated SEQ ID:73362, and is provided hereinbelow with reference to the sequence listing part.

[45447] VGAM3249 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3249 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45448] An enzyme complex designated DICER COMPLEX, dices the VGAM3249 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3249 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3249 RNA is designated SEQ ID:73363, and is provided hereinbelow with reference to the sequence listing part.

[45449] VGAM3249 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3249 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3249 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45450] VGAM3249 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3249 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3249 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3249 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3249 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45451] The complementary binding of VGAM3249 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3249 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3249 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3249 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45452] It is appreciated that VGAM3249 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3249 host target genes. The mRNA of each one of this plurality of VGAM3249 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3249 RNA, herein designated VGAM RNA, and which when bound by VGAM3249 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3249 host target proteins.

[45453] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3249 gene, herein designated VGAM GENE, on one or more VGAM3249 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45454] It is yet further appreciated that a function of VGAM3249 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3249 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 90. Specific functions, and accordingly utilities, of VGAM3249 correlate with, and may be deduced from, the identity of the host target genes which VGAM3249 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45455] Nucleotide sequences of the VGAM3249 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3249 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3249 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3249 are further described hereinbelow with reference to Table 1.

[45456] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3249 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45457] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3250 (VGAM3250) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45458] VGAM3250 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3250 was detected is described hereinabove with reference to Figs. 2–8.

[45459] VGAM3250 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 6. VGAM3250 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45460] VGAM3250 gene, herein designated VGAM GENE, encodes a VGAM3250 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3250 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3250 precursor RNA is designated SEQ ID:73366, and is provided hereinbelow with reference to the sequence listing part.

[45461] VGAM3250 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3250 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45462] An enzyme complex designated DICER COMPLEX, dices the VGAM3250 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3250 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3250 RNA is designated SEQ ID:73367, and is provided hereinbelow with reference to the sequence listing part.

[45463] VGAM3250 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3250 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3250 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45464] VGAM3250 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3250 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3250 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3250 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3250 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45465] The complementary binding of VGAM3250 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3250 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3250 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3250 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45466] It is appreciated that VGAM3250 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3250 host target genes. The mRNA of each one of this plurality of VGAM3250 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3250 RNA, herein designated VGAM RNA, and which when bound by VGAM3250 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3250 host target proteins.

[45467] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3250 gene, herein designated VGAM GENE, on one or more VGAM3250 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[45468] It is yet further appreciated that a function of VGAM3250 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3250 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 6. Specific functions, and accordingly utilities, of VGAM3250 correlate with, and may be deduced from, the identity of the host target genes which VGAM3250 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45469] Nucleotide sequences of the VGAM3250 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3250 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3250 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3250 are further described hereinbelow with reference to Table 1.

[45470] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3250 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45471] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3251 (VGAM3251) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45472] VGAM3251 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3251 was detected is described hereinabove with reference to Figs. 2–8.

[45473] VGAM3251 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3251 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45474] VGAM3251 gene, herein designated VGAM GENE, encodes a VGAM3251 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3251 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3251 precursor RNA is designated SEQ ID:73373, and is provided hereinbelow with reference to the sequence listing part.

[45475] VGAM3251 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3251 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45476] An enzyme complex designated DICER COMPLEX, dices the VGAM3251 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3251 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3251 RNA is designated SEQ ID:73374, and is provided hereinbelow with reference to the sequence listing part.

[45477] VGAM3251 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3251 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3251 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45478] VGAM3251 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3251 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3251 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3251 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3251 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45479] The complementary binding of VGAM3251 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3251 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3251 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3251 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45480] It is appreciated that VGAM3251 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3251 host target genes. The mRNA of

each one of this plurality of VGAM3251 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3251 RNA, herein designated VGAM RNA, and which when bound by VGAM3251 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3251 host target proteins.

[45481] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3251 gene, herein designated VGAM GENE, on one or more VGAM3251 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[45482] It is yet further appreciated that a function of VGAM3251 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3251 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3251 correlate with, and may be deduced from, the identity of the host target genes which VGAM3251 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45483] Nucleotide sequences of the VGAM3251 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3251 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3251 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3251 are further described hereinbelow with reference to Table 1.

[45484] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3251 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[45485] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3252 (VGAM3252) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45486] VGAM3252 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3252 was detected is described hereinabove with reference to Figs. 2–8.

[45487] VGAM3252 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3252 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45488] VGAM3252 gene, herein designated VGAM GENE, encodes a VGAM3252 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3252 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3252 precursor RNA is designated SEQ ID:73379, and is provided hereinbelow with reference to the sequence listing part.

[45489] VGAM3252 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3252 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45490] An enzyme complex designated DICER COMPLEX, dices the VGAM3252 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3252 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3252 RNA is designated SEQ ID:73380,

and is provided hereinbelow with reference to the sequence listing part.

[45491] VGAM3252 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3252 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3252 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45492] VGAM3252 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3252 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3252 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3252 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3252 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45493] The complementary binding of VGAM3252 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3252 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3252 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3252 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45494] It is appreciated that VGAM3252 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3252 host target genes. The mRNA of each one of this plurality of VGAM3252 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3252 RNA, herein designated VGAM RNA, and which when bound by VGAM3252 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3252 host target proteins.

[45495] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3252 gene, herein designated VGAM GENE, on one or more VGAM3252 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45496] It is yet further appreciated that a function of VGAM3252 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3252 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3252 correlate with, and may be deduced from, the identity of the host target genes which VGAM3252 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45497] Nucleotide sequences of the VGAM3252 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3252 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3252 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3252 are further described hereinbelow with reference to Table 1.

[45498] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3252 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45499] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3253 (VGAM3253) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45500] VGAM3253 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3253 was detected is described hereinabove with reference to Figs. 2–8.

[45501] VGAM3253 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV–1. VGAM3253 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45502] VGAM3253 gene, herein designated VGAM GENE, encodes a VGAM3253 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3253 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3253 precu-

sor RNA is designated SEQ ID:73393, and is provided hereinbelow with reference to the sequence listing part.

[45503] VGAM3253 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3253 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45504] An enzyme complex designated DICER COMPLEX, dices the VGAM3253 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3253 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3253 RNA is designated SEQ ID:73394, and is provided hereinbelow with reference to the se-

quence listing part.

[45505] VGAM3253 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3253 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3253 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45506] VGAM3253 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3253 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3253 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3253 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3253 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45507] The complementary binding of VGAM3253 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3253 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3253 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3253 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45508] It is appreciated that VGAM3253 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3253 host target genes. The mRNA of each one of this plurality of VGAM3253 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3253 RNA, herein designated VGAM RNA, and which when bound by VGAM3253 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3253 host target proteins.

[45509] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3253 gene, herein designated VGAM GENE, on one or more VGAM3253 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45510] It is yet further appreciated that a function of VGAM3253

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3253 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-1. Specific functions, and accordingly utilities, of VGAM3253 correlate with, and may be deduced from, the identity of the host target genes which VGAM3253 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45511] Nucleotide sequences of the VGAM3253 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3253 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3253 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3253 are further described hereinbelow with reference to Table 1.

[45512] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3253 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45513] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3254 (VGAM3254) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45514] VGAM3254 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3254 was detected is described hereinabove with reference to Figs. 2–8.

[45515] VGAM3254 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2. VGAM3254 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45516] VGAM3254 gene, herein designated VGAM GENE, encodes a VGAM3254 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3254 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3254 precursor RNA is designated SEQ ID:73398, and is provided

hereinbelow with reference to the sequence listing part.

[45517] VGAM3254 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3254 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45518] An enzyme complex designated DICER COMPLEX, dices the VGAM3254 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3254 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3254 RNA is designated SEQ ID:73399, and is provided hereinbelow with reference to the sequence listing part.

[45519] VGAM3254 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3254 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3254 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45520] VGAM3254 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3254 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3254 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3254 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3254 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45521] The complementary binding of VGAM3254 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3254 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3254 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3254 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45522] It is appreciated that VGAM3254 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3254 host target genes. The mRNA of each one of this plurality of VGAM3254 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3254 RNA, herein designated VGAM RNA, and which when bound by VGAM3254 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3254 host target proteins.

[45523] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3254 gene, herein designated VGAM GENE, on one or more VGAM3254 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45524] It is yet further appreciated that a function of VGAM3254 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3254 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3254 correlate with, and may be deduced from, the identity of the host target genes which VGAM3254 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45525] Nucleotide sequences of the VGAM3254 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3254 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3254 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3254 are further described hereinbelow with reference to Table 1.

[45526] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3254 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45527] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3255 (VGAM3255) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45528] VGAM3255 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3255 was detected is described hereinabove with reference to Figs. 2–8.

[45529] VGAM3255 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine respiratory syncytial virus. VGAM3255 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45530] VGAM3255 gene, herein designated VGAM GENE, encodes a VGAM3255 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3255 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3255 precursor RNA is designated SEQ ID:73415, and is provided hereinbelow with reference to the sequence listing part.

[45531] VGAM3255 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3255 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45532] An enzyme complex designated DICER COMPLEX, dices the VGAM3255 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3255 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3255 RNA is designated SEQ ID:73416, and is provided hereinbelow with reference to the sequence listing part.

[45533] VGAM3255 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3255 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3255 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45534] VGAM3255 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3255 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3255 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3255 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3255 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45535] The complementary binding of VGAM3255 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3255 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3255 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3255 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45536] It is appreciated that VGAM3255 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3255 host target genes. The mRNA of each one of this plurality of VGAM3255 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3255 RNA, herein designated VGAM

RNA, and which when bound by VGAM3255 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3255 host target proteins.

[45537] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3255 gene, herein designated VGAM GENE, on one or more VGAM3255 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45538] It is yet further appreciated that a function of VGAM3255 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3255 include diagnosis, prevention and treatment of viral infection by Bovine respiratory syncytial virus. Specific functions, and accordingly utilities, of VGAM3255 correlate with, and may be deduced from, the identity of the host target genes which VGAM3255 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45539] Nucleotide sequences of the VGAM3255 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3255 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3255 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3255 are further described hereinbelow with reference to Table 1.

[45540] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3255 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45541] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3256 (VGAM3256) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45542] VGAM3256 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3256 was detected is described hereinabove with reference to Figs. 2–8.

[45543] VGAM3256 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3256 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45544] VGAM3256 gene, herein designated VGAM GENE, encodes a VGAM3256 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3256 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3256 precursor RNA is designated SEQ ID:73425, and is provided hereinbelow with reference to the sequence listing part.

[45545] VGAM3256 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3256 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45546] An enzyme complex designated DICER COMPLEX, dices the VGAM3256 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3256 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3256 RNA is designated SEQ ID:73426, and is provided hereinbelow with reference to the sequence listing part.

[45547] VGAM3256 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3256 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3256 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45548] VGAM3256 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3256 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3256 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3256 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3256 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45549] The complementary binding of VGAM3256 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3256 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3256 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3256 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45550] It is appreciated that VGAM3256 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3256 host target genes. The mRNA of each one of this plurality of VGAM3256 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3256 RNA, herein designated VGAM RNA, and which when bound by VGAM3256 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3256 host target proteins.

[45551] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3256 gene, herein designated VGAM GENE, on one or more VGAM3256 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45552] It is yet further appreciated that a function of VGAM3256 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3256 include diagnosis, prevention and

treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3256 correlate with, and may be deduced from, the identity of the host target genes which VGAM3256 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45553] Nucleotide sequences of the VGAM3256 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3256 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3256 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3256 are further described hereinbelow with reference to Table 1.

[45554] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3256 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45555] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3257 (VGAM3257) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45556] VGAM3257 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3257 was detected is described hereinabove with reference to Figs. 2–8.

[45557] VGAM3257 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3257 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45558] VGAM3257 gene, herein designated VGAM GENE, encodes a VGAM3257 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3257 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3257 precursor RNA is designated SEQ ID:73428, and is provided hereinbelow with reference to the sequence listing part.

[45559] VGAM3257 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3257 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45560] An enzyme complex designated DICER COMPLEX, dices the VGAM3257 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3257 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3257 RNA is designated SEQ ID:73429, and is provided hereinbelow with reference to the sequence listing part.

[45561] VGAM3257 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3257 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3257 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45562] VGAM3257 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3257 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3257 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3257 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3257 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45563] The complementary binding of VGAM3257 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3257 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3257 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3257 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45564] It is appreciated that VGAM3257 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3257 host target genes. The mRNA of each one of this plurality of VGAM3257 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3257 RNA, herein designated VGAM RNA, and which when bound by VGAM3257 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3257 host target proteins.

[45565] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3257 gene, herein designated VGAM GENE, on one or more VGAM3257 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45566] It is yet further appreciated that a function of VGAM3257 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3257 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1.

Specific functions, and accordingly utilities, of VGAM3257 correlate with, and may be deduced from, the identity of the host target genes which VGAM3257 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45567] Nucleotide sequences of the VGAM3257 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3257 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3257 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3257 are further described hereinbelow with reference to Table 1.

[45568] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3257 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45569] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3258 (VGAM3258) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[45570] VGAM3258 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3258 was detected is described hereinabove with reference to Figs. 2–8.

[45571] VGAM3258 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Avian paramyxovirus 6. VGAM3258 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45572] VGAM3258 gene, herein designated VGAM GENE, encodes a VGAM3258 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3258 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3258 precursor RNA is designated SEQ ID:73432, and is provided hereinbelow with reference to the sequence listing part.

[45573] VGAM3258 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3258 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45574] An enzyme complex designated DICER COMPLEX, dices the VGAM3258 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3258 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3258 RNA is designated SEQ ID:73433, and is provided hereinbelow with reference to the sequence listing part.

[45575] VGAM3258 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3258 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3258 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45576] VGAM3258 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3258 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3258 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3258 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3258 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45577] The complementary binding of VGAM3258 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3258 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3258 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3258 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45578] It is appreciated that VGAM3258 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3258 host target genes. The mRNA of each one of this plurality of VGAM3258 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3258 RNA, herein designated VGAM RNA, and which when bound by VGAM3258 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3258 host target proteins.

[45579] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3258 gene, herein designated VGAM GENE, on one or more VGAM3258 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45580] It is yet further appreciated that a function of VGAM3258 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3258 include diagnosis, prevention and treatment of viral infection by Avian paramyxovirus 6. Specific functions, and accordingly utilities, of VGAM3258

correlate with, and may be deduced from, the identity of the host target genes which VGAM3258 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45581] Nucleotide sequences of the VGAM3258 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3258 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3258 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3258 are further described hereinbelow with reference to Table 1.

[45582] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3258 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45583] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3259 (VGAM3259) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[45584] VGAM3259 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3259 was detected is described hereinabove with reference to Figs. 2–8.

[45585] VGAM3259 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Avian paramyxovirus 6. VGAM3259 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45586] VGAM3259 gene, herein designated VGAM GENE, encodes a VGAM3259 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3259 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3259 precursor RNA is designated SEQ ID:73437, and is provided hereinbelow with reference to the sequence listing part.

[45587] VGAM3259 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3259 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45588] An enzyme complex designated DICER COMPLEX, dices the VGAM3259 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3259 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3259 RNA is designated SEQ ID:73438, and is provided hereinbelow with reference to the sequence listing part.

[45589] VGAM3259 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3259 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3259 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45590] VGAM3259 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3259 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3259 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3259 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3259 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45591] The complementary binding of VGAM3259 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3259 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3259 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3259 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45592] It is appreciated that VGAM3259 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3259 host target genes. The mRNA of each one of this plurality of VGAM3259 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3259 RNA, herein designated VGAM RNA, and which when bound by VGAM3259 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3259 host target proteins.

[45593] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3259 gene, herein designated VGAM GENE, on one or more VGAM3259 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45594] It is yet further appreciated that a function of VGAM3259 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3259 include diagnosis, prevention and treatment of viral infection by Avian paramyxovirus 6. Specific functions, and accordingly utilities, of VGAM3259 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3259 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45595] Nucleotide sequences of the VGAM3259 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3259 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3259 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3259 are further described hereinbelow with reference to Table 1.

[45596] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3259 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45597] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3260 (VGAM3260) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45598] VGAM3260 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3260 was detected is described hereinabove with reference to Figs. 2–8.

[45599] VGAM3260 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Peanut clump virus. VGAM3260 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45600] VGAM3260 gene, herein designated VGAM GENE, encodes a VGAM3260 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3260 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3260 precursor RNA is designated SEQ ID:73465, and is provided hereinbelow with reference to the sequence listing part.

[45601] VGAM3260 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3260 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45602] An enzyme complex designated DICER COMPLEX, dices the VGAM3260 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3260 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3260 RNA is designated SEQ ID:73466, and is provided hereinbelow with reference to the sequence listing part.

[45603] VGAM3260 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3260 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3260 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45604] VGAM3260 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3260 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3260 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3260 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3260 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45605] The complementary binding of VGAM3260 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3260 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3260 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3260 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45606] It is appreciated that VGAM3260 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3260 host target genes. The mRNA of each one of this plurality of VGAM3260 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3260 RNA, herein designated VGAM RNA, and which when bound by VGAM3260 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3260 host target proteins.

[45607] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3260 gene, herein designated VGAM GENE, on one or more VGAM3260 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45608] It is yet further appreciated that a function of VGAM3260 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3260 include diagnosis, prevention and treatment of viral infection by Peanut clump virus. Specific functions, and accordingly utilities, of VGAM3260 correlate with, and may be deduced from, the identity of the host target genes which VGAM3260 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[45609] Nucleotide sequences of the VGAM3260 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3260 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3260 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3260 are further described hereinbelow with reference to Table 1.

[45610] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3260 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45611] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3261 (VGAM3261) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45612] VGAM3261 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3261 was detected is described hereinabove with reference to Figs. 2–8.

[45613] VGAM3261 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3261 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45614] VGAM3261 gene, herein designated VGAM GENE, encodes a VGAM3261 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3261 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3261 precursor RNA is designated SEQ ID:73506, and is provided hereinbelow with reference to the sequence listing part.

[45615] VGAM3261 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3261 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45616] An enzyme complex designated DICER COMPLEX, dices the VGAM3261 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3261 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3261 RNA is designated SEQ ID:73507, and is provided hereinbelow with reference to the sequence listing part.

[45617] VGAM3261 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3261 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3261 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45618] VGAM3261 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3261 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3261 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3261 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3261 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[45619] The complementary binding of VGAM3261 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3261 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3261 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3261 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45620] It is appreciated that VGAM3261 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3261 host target genes. The mRNA of each one of this plurality of VGAM3261 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3261 RNA, herein designated VGAM RNA, and which when bound by VGAM3261 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3261 host target proteins.

[45621] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3261 gene, herein designated VGAM GENE, on one or more VGAM3261 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45622] It is yet further appreciated that a function of VGAM3261 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3261 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3261 correlate with, and may be deduced from, the identity of the host target genes which VGAM3261 binds and inhibits, and the function of these

host target genes, as elaborated hereinbelow.

[45623] Nucleotide sequences of the VGAM3261 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3261 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3261 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3261 are further described hereinbelow with reference to Table 1.

[45624] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3261 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45625] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3262 (VGAM3262) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45626] VGAM3262 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3262 was detected is described hereinabove with reference to Figs. 2–8.

[45627] VGAM3262 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Brome mosaic virus.

VGAM3262 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45628] VGAM3262 gene, herein designated VGAM GENE, encodes a VGAM3262 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3262 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3262 precursor RNA is designated SEQ ID:73511, and is provided hereinbelow with reference to the sequence listing part.

[45629] VGAM3262 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3262 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45630] An enzyme complex designated DICER COMPLEX, dices the VGAM3262 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3262 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3262 RNA is designated SEQ ID:73512, and is provided hereinbelow with reference to the sequence listing part.

[45631] VGAM3262 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3262 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3262 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[45632] VGAM3262 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3262 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3262 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3262 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3262 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45633] The complementary binding of VGAM3262 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3262 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3262 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3262 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45634] It is appreciated that VGAM3262 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3262 host target genes. The mRNA of each one of this plurality of VGAM3262 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3262 RNA, herein designated VGAM RNA, and which when bound by VGAM3262 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3262 host target proteins.

[45635] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3262 gene, herein designated VGAM GENE, on one

or more VGAM3262 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45636] It is yet further appreciated that a function of VGAM3262 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3262 include diagnosis, prevention and treatment of viral infection by Brome mosaic virus. Specific functions, and accordingly utilities, of VGAM3262 correlate with, and may be deduced from, the identity of the host target genes which VGAM3262 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45637] Nucleotide sequences of the VGAM3262 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3262 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3262 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3262 are further described hereinbelow with reference to Table 1.

[45638] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3262 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45639] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3263 (VGAM3263) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45640] VGAM3263 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3263 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[45641] VGAM3263 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 55. VGAM3263 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45642] VGAM3263 gene, herein designated VGAM GENE, encodes a VGAM3263 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3263 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3263 precursor RNA is designated SEQ ID:73541, and is provided hereinbelow with reference to the sequence listing part.

[45643] VGAM3263 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3263 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45644] An enzyme complex designated DICER COMPLEX, dices the VGAM3263 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3263 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3263 RNA is designated SEQ ID:73542, and is provided hereinbelow with reference to the sequence listing part.

[45645] VGAM3263 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3263 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3263 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45646] VGAM3263 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3263 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3263 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3263 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3263 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45647] The complementary binding of VGAM3263 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3263 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3263 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3263 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45648] It is appreciated that VGAM3263 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3263 host target genes. The mRNA of each one of this plurality of VGAM3263 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3263 RNA, herein designated VGAM RNA, and which when bound by VGAM3263 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3263 host target proteins.

[45649] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3263 gene, herein designated VGAM GENE, on one or more VGAM3263 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45650] It is yet further appreciated that a function of VGAM3263 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3263 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 55. Specific functions, and accordingly utilities, of VGAM3263 correlate with, and may be deduced from, the identity of the host target genes which VGAM3263 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45651] Nucleotide sequences of the VGAM3263 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the duced VGAM3263 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3263 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3263 are further described hereinbelow with reference to Table 1.

[45652] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3263 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45653] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3264 (VGAM3264) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45654] VGAM3264 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3264 was detected is described hereinabove with reference to Figs. 2-8.

[45655] VGAM3264 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 63. VGAM3264 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45656] VGAM3264 gene, herein designated VGAM GENE, encodes a VGAM3264 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3264 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3264 precursor RNA is designated SEQ ID:73550, and is provided hereinbelow with reference to the sequence listing part.

[45657] VGAM3264 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3264 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[45658] An enzyme complex designated DICER COMPLEX, dices the VGAM3264 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3264 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3264 RNA is designated SEQ ID:73551, and is provided hereinbelow with reference to the sequence listing part.

[45659] VGAM3264 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3264 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3264 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45660] VGAM3264 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3264 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3264 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3264 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3264 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45661] The complementary binding of VGAM3264 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3264 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3264 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3264 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45662] It is appreciated that VGAM3264 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3264 host target genes. The mRNA of each one of this plurality of VGAM3264 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3264 RNA, herein designated VGAM RNA, and which when bound by VGAM3264 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3264 host target proteins.

[45663] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3264 gene, herein designated VGAM GENE, on one or more VGAM3264 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45664] It is yet further appreciated that a function of VGAM3264 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3264 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 63. Specific functions, and accordingly utilities, of VGAM3264 correlate with, and may be deduced from, the identity of the host target genes which VGAM3264 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45665] Nucleotide sequences of the VGAM3264 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3264 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3264 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3264 are further described hereinbelow with reference to Table 1.

[45666] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3264 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45667] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3265 (VGAM3265) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45668] VGAM3265 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3265 was detected is described hereinabove with reference to Figs. 2-8.

[45669] VGAM3265 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Human papillomavirus type 63. VGAM3265 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45670] VGAM3265 gene, herein designated VGAM GENE, encodes a VGAM3265 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3265 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3265 precursor RNA is designated SEQ ID:73573, and is provided hereinbelow with reference to the sequence listing part.

[45671] VGAM3265 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3265 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45672] An enzyme complex designated DICER COMPLEX, dices the VGAM3265 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3265 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3265 RNA is designated SEQ ID:73574, and is provided hereinbelow with reference to the sequence listing part.

[45673] VGAM3265 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3265 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3265 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45674] VGAM3265 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3265 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3265 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3265 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3265 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45675] The complementary binding of VGAM3265 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3265 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3265 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3265 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45676] It is appreciated that VGAM3265 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3265 host target genes. The mRNA of each one of this plurality of VGAM3265 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3265 RNA, herein designated VGAM RNA, and which when bound by VGAM3265 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3265 host target proteins.

[45677] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3265 gene, herein designated VGAM GENE, on one or more VGAM3265 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45678] It is yet further appreciated that a function of VGAM3265 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3265 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 63. Specific functions, and accordingly utilities, of VGAM3265 correlate with, and may be deduced from, the identity of the host target genes which VGAM3265 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45679] Nucleotide sequences of the VGAM3265 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3265 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3265 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3265 are further described hereinbelow with reference to Table 1.

[45680] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3265 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45681] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3266 (VGAM3266) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45682] VGAM3266 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3266 was detected is described hereinabove with reference to Figs. 2-8.

[45683] VGAM3266 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus

type 44. VGAM3266 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45684] VGAM3266 gene, herein designated VGAM GENE, encodes a VGAM3266 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3266 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3266 precursor RNA is designated SEQ ID:73596, and is provided hereinbelow with reference to the sequence listing part.

[45685] VGAM3266 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3266 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45686] An enzyme complex designated DICER COMPLEX, dices

the VGAM3266 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3266 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3266 RNA is designated SEQ ID:73597, and is provided hereinbelow with reference to the sequence listing part.

[45687] VGAM3266 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3266 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3266 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45688] VGAM3266 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3266 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3266 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3266 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3266 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45689] The complementary binding of VGAM3266 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3266 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3266 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3266 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45690] It is appreciated that VGAM3266 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3266 host target genes. The mRNA of each one of this plurality of VGAM3266 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3266 RNA, herein designated VGAM RNA, and which when bound by VGAM3266 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3266 host target proteins.

[45691] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3266 gene, herein designated VGAM GENE, on one or more VGAM3266 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45692] It is yet further appreciated that a function of VGAM3266 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3266 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 44. Specific functions, and accordingly utilities, of VGAM3266 correlate with, and may be deduced from, the identity of the host target genes which VGAM3266 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45693] Nucleotide sequences of the VGAM3266 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3266 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3266 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3266 are further described hereinbelow with reference to Table 1.

[45694] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3266 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45695] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3267 (VGAM3267) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45696] VGAM3267 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3267 was detected is described hereinabove with reference to Figs. 2-8.

[45697] VGAM3267 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 60. VGAM3267 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45698] VGAM3267 gene, herein designated VGAM GENE, encodes a VGAM3267 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3267 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3267 precursor RNA is designated SEQ ID:73606, and is provided hereinbelow with reference to the sequence listing part.

[45699] VGAM3267 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3267 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45700] An enzyme complex designated DICER COMPLEX, dices the VGAM3267 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3267 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3267 RNA is designated SEQ ID:73607, and is provided hereinbelow with reference to the sequence listing part.

[45701] VGAM3267 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3267 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3267 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45702] VGAM3267 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3267 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3267 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3267 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3267 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45703] The complementary binding of VGAM3267 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3267 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3267

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3267 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45704] It is appreciated that VGAM3267 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3267 host target genes. The mRNA of each one of this plurality of VGAM3267 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3267 RNA, herein designated VGAM RNA, and which when bound by VGAM3267 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3267 host target proteins.

[45705] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3267 gene, herein designated VGAM GENE, on one or more VGAM3267 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45706] It is yet further appreciated that a function of VGAM3267 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3267 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 60. Specific functions, and accordingly utilities, of VGAM3267 correlate with, and may be deduced from, the identity of the host target genes which VGAM3267 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45707] Nucleotide sequences of the VGAM3267 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3267 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3267 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3267 are further described hereinbelow with reference to Table 1.

[45708] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3267 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45709] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3268 (VGAM3268) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45710] VGAM3268 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3268 was detected is described hereinabove with reference to Figs. 2-8.

[45711] VGAM3268 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pestivirus type 3. VGAM3268 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[45712] VGAM3268 gene, herein designated VGAM GENE, encodes a VGAM3268 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3268 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3268 precursor RNA is designated SEQ ID:73612, and is provided hereinbelow with reference to the sequence listing part.

[45713] VGAM3268 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3268 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45714] An enzyme complex designated DICER COMPLEX, dices the VGAM3268 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3268 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3268 RNA is designated SEQ ID:73613, and is provided hereinbelow with reference to the sequence listing part.

[45715] VGAM3268 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3268 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3268 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45716] VGAM3268 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3268 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3268 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3268 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3268 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45717] The complementary binding of VGAM3268 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3268 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3268 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3268 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45718] It is appreciated that VGAM3268 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3268 host target genes. The mRNA of each one of this plurality of VGAM3268 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3268 RNA, herein designated VGAM RNA, and which when bound by VGAM3268 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3268 host target proteins.

[45719] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3268 gene, herein designated VGAM GENE, on one or more VGAM3268 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45720] It is yet further appreciated that a function of VGAM3268 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3268 include diagnosis, prevention and treatment of viral infection by Pestivirus type 3. Specific functions, and accordingly utilities, of VGAM3268 correlate with, and may be deduced from, the identity of the host target genes which VGAM3268 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45721] Nucleotide sequences of the VGAM3268 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3268 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3268 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3268 are further

described hereinbelow with reference to Table 1.

[45722] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3268 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45723] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3269 (VGAM3269) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45724] VGAM3269 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3269 was detected is described hereinabove with reference to Figs. 2-8.

[45725] VGAM3269 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3269 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45726] VGAM3269 gene, herein designated VGAM GENE, encodes a VGAM3269 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3269 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3269 precursor RNA is designated SEQ ID:73627, and is provided hereinbelow with reference to the sequence listing part.

[45727] VGAM3269 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3269 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45728] An enzyme complex designated DICER COMPLEX, dices the VGAM3269 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3269 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3269 RNA is designated SEQ ID:73628, and is provided hereinbelow with reference to the sequence listing part.

[45729] VGAM3269 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3269 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3269 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45730] VGAM3269 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3269 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3269 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3269 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3269 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45731] The complementary binding of VGAM3269 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3269 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3269 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3269 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45732] It is appreciated that VGAM3269 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3269 host target genes. The mRNA of each one of this plurality of VGAM3269 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3269 RNA, herein designated VGAM RNA, and which when bound by VGAM3269 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3269 host target proteins.

[45733] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3269 gene, herein designated VGAM GENE, on one or more VGAM3269 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45734] It is yet further appreciated that a function of VGAM3269 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3269 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3269 correlate with, and may be deduced from, the identity of the host target genes which VGAM3269 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45735] Nucleotide sequences of the VGAM3269 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3269 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3269 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3269 are further described hereinbelow with reference to Table 1.

[45736] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3269 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45737] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3270 (VGAM3270) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45738] VGAM3270 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3270 was detected is described hereinabove with reference to Figs. 2-8.

[45739] VGAM3270 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 65. VGAM3270 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45740] VGAM3270 gene, herein designated VGAM GENE, encodes

a VGAM3270 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3270 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3270 precursor RNA is designated SEQ ID:73648, and is provided hereinbelow with reference to the sequence listing part.

[45741] VGAM3270 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3270 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45742] An enzyme complex designated DICER COMPLEX, dices the VGAM3270 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3270 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3270 RNA is designated SEQ ID:73649, and is provided hereinbelow with reference to the sequence listing part.

[45743] VGAM3270 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3270 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3270 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45744] VGAM3270 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3270 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3270 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3270 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3270 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45745] The complementary binding of VGAM3270 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3270 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3270 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3270 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[45746] It is appreciated that VGAM3270 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3270 host target genes. The mRNA of each one of this plurality of VGAM3270 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3270 RNA, herein designated VGAM RNA, and which when bound by VGAM3270 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3270 host target proteins.

[45747] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3270 gene, herein designated VGAM GENE, on one or more VGAM3270 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45748] It is yet further appreciated that a function of VGAM3270 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3270 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 65. Specific functions, and accordingly utilities, of VGAM3270 correlate with, and may be deduced from, the identity of the host target genes which VGAM3270 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45749] Nucleotide sequences of the VGAM3270 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3270 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3270 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3270 are further described hereinbelow with reference to Table 1.

[45750] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3270 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45751] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3271 (VGAM3271) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45752] VGAM3271 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3271 was detected is described hereinabove with reference to Figs. 2-8.

[45753] VGAM3271 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 25. VGAM3271 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45754] VGAM3271 gene, herein designated VGAM GENE, encodes a VGAM3271 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3271 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3271 precursor RNA is designated SEQ ID:73673, and is provided hereinbelow with reference to the sequence listing part.

[45755] VGAM3271 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3271 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45756] An enzyme complex designated DICER COMPLEX, dices the VGAM3271 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3271 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3271 RNA is designated SEQ ID:73674, and is provided hereinbelow with reference to the sequence listing part.

[45757] VGAM3271 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3271 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3271 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45758] VGAM3271 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3271 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3271 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3271 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3271 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45759] The complementary binding of VGAM3271 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3271 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3271 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3271 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45760] It is appreciated that VGAM3271 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3271 host target genes. The mRNA of each one of this plurality of VGAM3271 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3271 RNA, herein designated VGAM RNA, and which when bound by VGAM3271 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3271 host target proteins.

[45761] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3271 gene, herein designated VGAM GENE, on one or more VGAM3271 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45762] It is yet further appreciated that a function of VGAM3271 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3271 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 25. Specific functions, and accordingly utilities, of VGAM3271 correlate with, and may be deduced from, the identity of the host target genes which VGAM3271 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45763] Nucleotide sequences of the VGAM3271 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3271 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3271 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3271 are further described hereinbelow with reference to Table 1.

[45764] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3271 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45765] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3272 (VGAM3272) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45766] VGAM3272 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3272 was detected is described hereinabove with reference to Figs. 2-8.

[45767] VGAM3272 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus.

VGAM3272 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45768] VGAM3272 gene, herein designated VGAM GENE, encodes a VGAM3272 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3272 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3272 precursor RNA is designated SEQ ID:73693, and is provided hereinbelow with reference to the sequence listing part.

[45769] VGAM3272 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3272 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45770] An enzyme complex designated DICER COMPLEX, dices the VGAM3272 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3272 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3272 RNA is designated SEQ ID:73694, and is provided hereinbelow with reference to the sequence listing part.

[45771] VGAM3272 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3272 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3272 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45772] VGAM3272 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3272 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3272 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3272 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3272 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45773] The complementary binding of VGAM3272 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3272 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3272 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3272 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45774] It is appreciated that VGAM3272 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3272 host target genes. The mRNA of each one of this plurality of VGAM3272 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3272 RNA, herein designated VGAM RNA, and which when bound by VGAM3272 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3272 host target proteins.

[45775] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3272 gene, herein designated VGAM GENE, on one or more VGAM3272 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45776] It is yet further appreciated that a function of VGAM3272 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3272 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3272 correlate with, and may be deduced from, the identity of the host target genes which VGAM3272 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45777] Nucleotide sequences of the VGAM3272 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3272 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3272 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3272 are further described hereinbelow with reference to Table 1.

[45778] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3272 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45779] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3273 (VGAM3273) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45780] VGAM3273 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3273 was detected is described hereinabove with reference to Figs. 2–8.

[45781] VGAM3273 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Canine parvovirus. VGAM3273 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45782] VGAM3273 gene, herein designated VGAM GENE, encodes a VGAM3273 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3273 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3273 precursor RNA is designated SEQ ID:73713, and is provided hereinbelow with reference to the sequence listing part.

[45783] VGAM3273 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3273 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45784] An enzyme complex designated DICER COMPLEX, dices the VGAM3273 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3273 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3273 RNA is designated SEQ ID:73714, and is provided hereinbelow with reference to the sequence listing part.

[45785] VGAM3273 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3273 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3273 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45786] VGAM3273 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3273 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3273 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3273 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3273 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45787] The complementary binding of VGAM3273 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3273 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3273 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3273 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45788] It is appreciated that VGAM3273 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3273 host target genes. The mRNA of each one of this plurality of VGAM3273 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3273 RNA, herein designated VGAM RNA, and which when bound by VGAM3273 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3273 host target proteins.

[45789] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3273 gene, herein designated VGAM GENE, on one or more VGAM3273 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[45790] It is yet further appreciated that a function of VGAM3273 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3273 include diagnosis, prevention and treatment of viral infection by Canine parvovirus. Specific functions, and accordingly utilities, of VGAM3273 correlate with, and may be deduced from, the identity of the host target genes which VGAM3273 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45791] Nucleotide sequences of the VGAM3273 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3273 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3273 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3273 are further described hereinbelow with reference to Table 1.

[45792] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3273 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45793] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3274 (VGAM3274) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45794] VGAM3274 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3274 was detected is described hereinabove with reference to Figs. 2-8.

[45795] VGAM3274 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus. VGAM3274 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45796] VGAM3274 gene, herein designated VGAM GENE, encodes a VGAM3274 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3274 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3274 precursor RNA is designated SEQ ID:73718, and is provided hereinbelow with reference to the sequence listing part.

[45797] VGAM3274 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3274 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45798] An enzyme complex designated DICER COMPLEX, dices the VGAM3274 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3274 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3274 RNA is designated SEQ ID:73719, and is provided hereinbelow with reference to the sequence listing part.

[45799] VGAM3274 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3274 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3274 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45800] VGAM3274 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3274 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3274 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3274 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3274 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45801] The complementary binding of VGAM3274 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3274 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3274 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3274 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45802] It is appreciated that VGAM3274 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3274 host target genes. The mRNA of

each one of this plurality of VGAM3274 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3274 RNA, herein designated VGAM RNA, and which when bound by VGAM3274 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3274 host target proteins.

[45803] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3274 gene, herein designated VGAM GENE, on one or more VGAM3274 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[45804] It is yet further appreciated that a function of VGAM3274 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3274 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3274 correlate with, and may be deduced from, the identity of the host target genes which VGAM3274 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45805] Nucleotide sequences of the VGAM3274 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3274 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3274 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3274 are further described hereinbelow with reference to Table 1.

[45806] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3274 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[45807] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3275 (VGAM3275) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45808] VGAM3275 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3275 was detected is described hereinabove with reference to Figs. 2–8.

[45809] VGAM3275 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3275 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45810] VGAM3275 gene, herein designated VGAM GENE, encodes a VGAM3275 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3275 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3275 precursor RNA is designated SEQ ID:73721, and is provided hereinbelow with reference to the sequence listing part.

[45811] VGAM3275 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3275 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45812] An enzyme complex designated DICER COMPLEX, dices the VGAM3275 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3275 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3275 RNA is designated SEQ ID:73722,

and is provided hereinbelow with reference to the sequence listing part.

[45813] VGAM3275 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3275 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3275 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45814] VGAM3275 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3275 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3275 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3275 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3275 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45815] The complementary binding of VGAM3275 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3275 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3275 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3275 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45816] It is appreciated that VGAM3275 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3275 host target genes. The mRNA of each one of this plurality of VGAM3275 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3275 RNA, herein designated VGAM RNA, and which when bound by VGAM3275 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3275 host target proteins.

[45817] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3275 gene, herein designated VGAM GENE, on one or more VGAM3275 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45818] It is yet further appreciated that a function of VGAM3275 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3275 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3275 correlate with, and may be deduced from, the identity of the host target genes which VGAM3275 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45819] Nucleotide sequences of the VGAM3275 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3275 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3275 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3275 are further described hereinbelow with reference to Table 1.

[45820] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3275 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45821] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3276 (VGAM3276) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45822] VGAM3276 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3276 was detected is described hereinabove with reference to Figs. 2–8.

[45823] VGAM3276 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus. VGAM3276 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45824] VGAM3276 gene, herein designated VGAM GENE, encodes a VGAM3276 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3276 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3276 precu-

sor RNA is designated SEQ ID:73731, and is provided hereinbelow with reference to the sequence listing part.

[45825] VGAM3276 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3276 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45826] An enzyme complex designated DICER COMPLEX, dices the VGAM3276 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3276 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3276 RNA is designated SEQ ID:73732, and is provided hereinbelow with reference to the se-

quence listing part.

[45827] VGAM3276 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3276 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3276 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45828] VGAM3276 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3276 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3276 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3276 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3276 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45829] The complementary binding of VGAM3276 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3276 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3276 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3276 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45830] It is appreciated that VGAM3276 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3276 host target genes. The mRNA of each one of this plurality of VGAM3276 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3276 RNA, herein designated VGAM RNA, and which when bound by VGAM3276 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3276 host target proteins.

[45831] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3276 gene, herein designated VGAM GENE, on one or more VGAM3276 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45832] It is yet further appreciated that a function of VGAM3276

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3276 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3276 correlate with, and may be deduced from, the identity of the host target genes which VGAM3276 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45833] Nucleotide sequences of the VGAM3276 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3276 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3276 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3276 are further described hereinbelow with reference to Table 1.

[45834] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3276 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45835] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3277 (VGAM3277) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45836] VGAM3277 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3277 was detected is described hereinabove with reference to Figs. 2–8.

[45837] VGAM3277 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus. VGAM3277 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45838] VGAM3277 gene, herein designated VGAM GENE, encodes a VGAM3277 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3277 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3277 precursor RNA is designated SEQ ID:73740, and is provided

hereinbelow with reference to the sequence listing part.

[45839] VGAM3277 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3277 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45840] An enzyme complex designated DICER COMPLEX, dices the VGAM3277 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3277 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3277 RNA is designated SEQ ID:73741, and is provided hereinbelow with reference to the sequence listing part.

[45841] VGAM3277 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3277 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3277 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45842] VGAM3277 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3277 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3277 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3277 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3277 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45843] The complementary binding of VGAM3277 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3277 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3277 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3277 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45844] It is appreciated that VGAM3277 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3277 host target genes. The mRNA of each one of this plurality of VGAM3277 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3277 RNA, herein designated VGAM RNA, and which when bound by VGAM3277 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3277 host target proteins.

[45845] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3277 gene, herein designated VGAM GENE, on one or more VGAM3277 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45846] It is yet further appreciated that a function of VGAM3277 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3277 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3277 correlate with, and may be deduced from, the identity of the host target genes which VGAM3277 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45847] Nucleotide sequences of the VGAM3277 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3277 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3277 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3277 are further described hereinbelow with reference to Table 1.

[45848] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3277 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45849] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3278 (VGAM3278) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45850] VGAM3278 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3278 was detected is described hereinabove with reference to Figs. 2–8.

[45851] VGAM3278 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Feline immunodeficiency virus. VGAM3278 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45852] VGAM3278 gene, herein designated VGAM GENE, encodes a VGAM3278 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3278 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3278 precursor RNA is designated SEQ ID:73789, and is provided hereinbelow with reference to the sequence listing part.

[45853] VGAM3278 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3278 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45854] An enzyme complex designated DICER COMPLEX, dices the VGAM3278 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3278 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3278 RNA is designated SEQ ID:73790, and is provided hereinbelow with reference to the sequence listing part.

[45855] VGAM3278 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3278 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3278 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45856] VGAM3278 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3278 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3278 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3278 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3278 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45857] The complementary binding of VGAM3278 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3278 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3278 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3278 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45858] It is appreciated that VGAM3278 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3278 host target genes. The mRNA of each one of this plurality of VGAM3278 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3278 RNA, herein designated VGAM

RNA, and which when bound by VGAM3278 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3278 host target proteins.

[45859] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3278 gene, herein designated VGAM GENE, on one or more VGAM3278 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45860] It is yet further appreciated that a function of VGAM3278 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3278 include diagnosis, prevention and treatment of viral infection by Feline immunodeficiency virus. Specific functions, and accordingly utilities, of VGAM3278 correlate with, and may be deduced from, the identity of the host target genes which VGAM3278 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45861] Nucleotide sequences of the VGAM3278 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3278 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3278 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3278 are further described hereinbelow with reference to Table 1.

[45862] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3278 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45863] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3279 (VGAM3279) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45864] VGAM3279 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3279 was detected is described hereinabove with reference to Figs. 2-8.

[45865] VGAM3279 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Feline immunodeficiency virus. VGAM3279 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45866] VGAM3279 gene, herein designated VGAM GENE, encodes a VGAM3279 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3279 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3279 precursor RNA is designated SEQ ID:73799, and is provided hereinbelow with reference to the sequence listing part.

[45867] VGAM3279 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3279 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45868] An enzyme complex designated DICER COMPLEX, dices the VGAM3279 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3279 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3279 RNA is designated SEQ ID:73800, and is provided hereinbelow with reference to the sequence listing part.

[45869] VGAM3279 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3279 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3279 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45870] VGAM3279 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3279 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3279 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3279 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3279 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45871] The complementary binding of VGAM3279 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3279 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3279 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3279 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45872] It is appreciated that VGAM3279 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3279 host target genes. The mRNA of each one of this plurality of VGAM3279 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3279 RNA, herein designated VGAM RNA, and which when bound by VGAM3279 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3279 host target proteins.

[45873] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3279 gene, herein designated VGAM GENE, on one or more VGAM3279 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45874] It is yet further appreciated that a function of VGAM3279 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3279 include diagnosis, prevention and treatment of viral infection by Feline immunodeficiency virus. Specific functions, and accordingly utilities, of VGAM3279 correlate with, and may be deduced from, the identity of the host target genes which VGAM3279 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45875] Nucleotide sequences of the VGAM3279 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3279 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3279 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3279 are further described hereinbelow with reference to Table 1.

[45876] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3279 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45877] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3280 (VGAM3280) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45878] VGAM3280 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3280 was detected is described hereinabove with reference to Figs. 2–8.

[45879] VGAM3280 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3280 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45880] VGAM3280 gene, herein designated VGAM GENE, encodes a VGAM3280 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3280 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3280 precu-

sor RNA is designated SEQ ID:73815, and is provided hereinbelow with reference to the sequence listing part.

[45881] VGAM3280 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3280 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45882] An enzyme complex designated DICER COMPLEX, dices the VGAM3280 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3280 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3280 RNA is designated SEQ ID:73816, and is provided hereinbelow with reference to the se-

quence listing part.

[45883] VGAM3280 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3280 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3280 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45884] VGAM3280 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3280 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3280 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3280 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3280 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45885] The complementary binding of VGAM3280 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3280 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3280 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3280 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45886] It is appreciated that VGAM3280 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3280 host target genes. The mRNA of each one of this plurality of VGAM3280 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3280 RNA, herein designated VGAM RNA, and which when bound by VGAM3280 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3280 host target proteins.

[45887] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3280 gene, herein designated VGAM GENE, on one or more VGAM3280 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45888] It is yet further appreciated that a function of VGAM3280

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3280 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3280 correlate with, and may be deduced from, the identity of the host target genes which VGAM3280 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45889] Nucleotide sequences of the VGAM3280 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3280 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3280 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3280 are further described hereinbelow with reference to Table 1.

[45890] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3280 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45891] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3281 (VGAM3281) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45892] VGAM3281 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3281 was detected is described hereinabove with reference to Figs. 2–8.

[45893] VGAM3281 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 15. VGAM3281 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45894] VGAM3281 gene, herein designated VGAM GENE, encodes a VGAM3281 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3281 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3281 precursor RNA is designated SEQ ID:73823, and is provided

hereinbelow with reference to the sequence listing part.

[45895] VGAM3281 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3281 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45896] An enzyme complex designated DICER COMPLEX, dices the VGAM3281 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3281 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3281 RNA is designated SEQ ID:73824, and is provided hereinbelow with reference to the sequence listing part.

[45897] VGAM3281 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3281 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3281 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45898] VGAM3281 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3281 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3281 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3281 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3281 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45899] The complementary binding of VGAM3281 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3281 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3281 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3281 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45900] It is appreciated that VGAM3281 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3281 host target genes. The mRNA of each one of this plurality of VGAM3281 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3281 RNA, herein designated VGAM RNA, and which when bound by VGAM3281 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3281 host target proteins.

[45901] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3281 gene, herein designated VGAM GENE, on one or more VGAM3281 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45902] It is yet further appreciated that a function of VGAM3281 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3281 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 15. Specific functions, and accordingly utilities, of VGAM3281 correlate with, and may be deduced from, the identity of the host target genes which VGAM3281 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45903] Nucleotide sequences of the VGAM3281 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3281 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3281 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3281 are further described hereinbelow with reference to Table 1.

[45904] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3281 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45905] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3282 (VGAM3282) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45906] VGAM3282 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3282 was detected is described hereinabove with reference to Figs. 2–8.

[45907] VGAM3282 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 9. VGAM3282 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45908] VGAM3282 gene, herein designated VGAM GENE, encodes a VGAM3282 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3282 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3282 precursor RNA is designated SEQ ID:73828, and is provided hereinbelow with reference to the sequence listing part.

[45909] VGAM3282 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3282 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45910] An enzyme complex designated DICER COMPLEX, dices the VGAM3282 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3282 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3282 RNA is designated SEQ ID:73829, and is provided hereinbelow with reference to the sequence listing part.

[45911] VGAM3282 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3282 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3282 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45912] VGAM3282 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3282 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3282 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3282 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3282 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45913] The complementary binding of VGAM3282 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3282 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3282 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3282 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45914] It is appreciated that VGAM3282 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3282 host target genes. The mRNA of each one of this plurality of VGAM3282 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3282 RNA, herein designated VGAM

RNA, and which when bound by VGAM3282 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3282 host target proteins.

[45915] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3282 gene, herein designated VGAM GENE, on one or more VGAM3282 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45916] It is yet further appreciated that a function of VGAM3282 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3282 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 9. Specific functions, and accordingly utilities, of VGAM3282 correlate with, and may be deduced from, the identity of the host target genes which VGAM3282 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45917] Nucleotide sequences of the VGAM3282 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3282 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3282 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3282 are further described hereinbelow with reference to Table 1.

[45918] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3282 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45919] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3283 (VGAM3283) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45920] VGAM3283 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3283 was detected is described hereinabove with reference to Figs. 2-8.

[45921] VGAM3283 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 2. VGAM3283 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45922] VGAM3283 gene, herein designated VGAM GENE, encodes a VGAM3283 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3283 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3283 precursor RNA is designated SEQ ID:73839, and is provided hereinbelow with reference to the sequence listing part.

[45923] VGAM3283 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3283 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45924] An enzyme complex designated DICER COMPLEX, dices the VGAM3283 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3283 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3283 RNA is designated SEQ ID:73840, and is provided hereinbelow with reference to the sequence listing part.

[45925] VGAM3283 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3283 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3283 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45926] VGAM3283 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3283 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3283 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3283 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3283 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45927] The complementary binding of VGAM3283 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3283 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3283 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3283 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45928] It is appreciated that VGAM3283 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3283 host target genes. The mRNA of each one of this plurality of VGAM3283 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3283 RNA, herein designated VGAM RNA, and which when bound by VGAM3283 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3283 host target proteins.

[45929] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3283 gene, herein designated VGAM GENE, on one or more VGAM3283 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45930] It is yet further appreciated that a function of VGAM3283 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3283 include diagnosis, prevention and

treatment of viral infection by Equine herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3283 correlate with, and may be deduced from, the identity of the host target genes which VGAM3283 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45931] Nucleotide sequences of the VGAM3283 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3283 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3283 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3283 are further described hereinbelow with reference to Table 1.

[45932] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3283 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45933] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3284 (VGAM3284) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45934] VGAM3284 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3284 was detected is described hereinabove with reference to Figs. 2–8.

[45935] VGAM3284 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 2. VGAM3284 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45936] VGAM3284 gene, herein designated VGAM GENE, encodes a VGAM3284 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3284 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3284 precursor RNA is designated SEQ ID:73844, and is provided hereinbelow with reference to the sequence listing part.

[45937] VGAM3284 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3284 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45938] An enzyme complex designated DICER COMPLEX, dices the VGAM3284 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3284 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3284 RNA is designated SEQ ID:73845, and is provided hereinbelow with reference to the sequence listing part.

[45939] VGAM3284 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3284 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3284 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45940] VGAM3284 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3284 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3284 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3284 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3284 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45941] The complementary binding of VGAM3284 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3284 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3284 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3284 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45942] It is appreciated that VGAM3284 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3284 host target genes. The mRNA of each one of this plurality of VGAM3284 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3284 RNA, herein designated VGAM RNA, and which when bound by VGAM3284 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3284 host target proteins.

[45943] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3284 gene, herein designated VGAM GENE, on one or more VGAM3284 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45944] It is yet further appreciated that a function of VGAM3284 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3284 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 2. Spe-

cific functions, and accordingly utilities, of VGAM3284 correlate with, and may be deduced from, the identity of the host target genes which VGAM3284 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45945] Nucleotide sequences of the VGAM3284 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3284 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3284 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3284 are further described hereinbelow with reference to Table 1.

[45946] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3284 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45947] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3285 (VGAM3285) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[45948] VGAM3285 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3285 was detected is described hereinabove with reference to Figs. 2–8.

[45949] VGAM3285 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus. VGAM3285 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45950] VGAM3285 gene, herein designated VGAM GENE, encodes a VGAM3285 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3285 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3285 precursor RNA is designated SEQ ID:73875, and is provided hereinbelow with reference to the sequence listing part.

[45951] VGAM3285 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3285 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45952] An enzyme complex designated DICER COMPLEX, dices the VGAM3285 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3285 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3285 RNA is designated SEQ ID:73876, and is provided hereinbelow with reference to the sequence listing part.

[45953] VGAM3285 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3285 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3285 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45954] VGAM3285 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3285 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3285 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3285 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3285 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45955] The complementary binding of VGAM3285 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3285 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3285 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3285 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45956] It is appreciated that VGAM3285 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3285 host target genes. The mRNA of each one of this plurality of VGAM3285 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3285 RNA, herein designated VGAM RNA, and which when bound by VGAM3285 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3285 host target proteins.

[45957] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3285 gene, herein designated VGAM GENE, on one or more VGAM3285 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45958] It is yet further appreciated that a function of VGAM3285 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3285 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3285 corre-

late with, and may be deduced from, the identity of the host target genes which VGAM3285 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45959] Nucleotide sequences of the VGAM3285 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3285 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3285 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3285 are further described hereinbelow with reference to Table 1.

[45960] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3285 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45961] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3286 (VGAM3286) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[45962] VGAM3286 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3286 was detected is described hereinabove with reference to Figs. 2–8.

[45963] VGAM3286 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3286 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45964] VGAM3286 gene, herein designated VGAM GENE, encodes a VGAM3286 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3286 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3286 precursor RNA is designated SEQ ID:73886, and is provided hereinbelow with reference to the sequence listing part.

[45965] VGAM3286 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3286 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45966] An enzyme complex designated DICER COMPLEX, dices the VGAM3286 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3286 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3286 RNA is designated SEQ ID:73887, and is provided hereinbelow with reference to the sequence listing part.

[45967] VGAM3286 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3286 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3286 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45968] VGAM3286 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3286 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3286 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3286 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3286 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45969] The complementary binding of VGAM3286 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3286 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3286 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3286 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45970] It is appreciated that VGAM3286 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3286 host target genes. The mRNA of each one of this plurality of VGAM3286 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3286 RNA, herein designated VGAM RNA, and which when bound by VGAM3286 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3286 host target proteins.

[45971] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3286 gene, herein designated VGAM GENE, on one or more VGAM3286 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45972] It is yet further appreciated that a function of VGAM3286 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3286 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3286 correlate with, and may be deduced

from, the identity of the host target genes which VGAM3286 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[45973] Nucleotide sequences of the VGAM3286 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3286 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3286 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3286 are further described hereinbelow with reference to Table 1.

[45974] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3286 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45975] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3287 (VGAM3287) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45976] VGAM3287 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3287 was detected is described hereinabove with reference to Figs. 2–8.

[45977] VGAM3287 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus. VGAM3287 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45978] VGAM3287 gene, herein designated VGAM GENE, encodes a VGAM3287 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3287 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3287 precursor RNA is designated SEQ ID:73893, and is provided hereinbelow with reference to the sequence listing part.

[45979] VGAM3287 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3287 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45980] An enzyme complex designated DICER COMPLEX, dices the VGAM3287 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3287 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3287 RNA is designated SEQ ID:73894, and is provided hereinbelow with reference to the sequence listing part.

[45981] VGAM3287 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3287 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3287 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45982] VGAM3287 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3287 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3287 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3287 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3287 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[45983] The complementary binding of VGAM3287 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3287 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3287 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3287 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45984] It is appreciated that VGAM3287 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3287 host target genes. The mRNA of each one of this plurality of VGAM3287 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3287 RNA, herein designated VGAM RNA, and which when bound by VGAM3287 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3287 host target proteins.

[45985] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3287 gene, herein designated VGAM GENE, on one or more VGAM3287 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[45986] It is yet further appreciated that a function of VGAM3287 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3287 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3287 correlate with, and may be deduced from, the identity of the host target genes which VGAM3287 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[45987] Nucleotide sequences of the VGAM3287 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3287 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3287 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3287 are further described hereinbelow with reference to Table 1.

[45988] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3287 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[45989] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3288 (VGAM3288) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[45990] VGAM3288 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3288 was detected is described hereinabove with reference to Figs. 2–8.

[45991] VGAM3288 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3288 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[45992] VGAM3288 gene, herein designated VGAM GENE, encodes a VGAM3288 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3288 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3288 precursor RNA is designated SEQ ID:73897, and is provided hereinbelow with reference to the sequence listing part.

[45993] VGAM3288 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3288 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[45994] An enzyme complex designated DICER COMPLEX, dices the VGAM3288 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3288 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3288 RNA is designated SEQ ID:73898, and is provided hereinbelow with reference to the sequence listing part.

[45995] VGAM3288 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3288 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3288 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[45996] VGAM3288 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3288 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3288 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3288 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3288 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[45997] The complementary binding of VGAM3288 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3288 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3288 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3288 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[45998] It is appreciated that VGAM3288 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3288 host target genes. The mRNA of each one of this plurality of VGAM3288 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3288 RNA, herein designated VGAM RNA, and which when bound by VGAM3288 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3288 host target proteins.

[45999] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3288 gene, herein designated VGAM GENE, on one or more VGAM3288 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46000] It is yet further appreciated that a function of VGAM3288 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3288 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3288 correlate with, and may be deduced from, the identity of the host target genes which VGAM3288 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[46001] Nucleotide sequences of the VGAM3288 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3288 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3288 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3288 are further described hereinbelow with reference to Table 1.

[46002] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3288 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46003] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3289 (VGAM3289) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46004] VGAM3289 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3289 was detected is described hereinabove with reference to Figs. 2–8.

[46005] VGAM3289 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3289 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46006] VGAM3289 gene, herein designated VGAM GENE, encodes a VGAM3289 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3289 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3289 precursor RNA is designated SEQ ID:73902, and is provided hereinbelow with reference to the sequence listing part.

[46007] VGAM3289 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3289 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46008] An enzyme complex designated DICER COMPLEX, dices the VGAM3289 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3289 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3289 RNA is designated SEQ ID:73903, and is provided hereinbelow with reference to the sequence listing part.

[46009] VGAM3289 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3289 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3289 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[46010] VGAM3289 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3289 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3289 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3289 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3289 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46011] The complementary binding of VGAM3289 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3289 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3289 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3289 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46012] It is appreciated that VGAM3289 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3289 host target genes. The mRNA of each one of this plurality of VGAM3289 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3289 RNA, herein designated VGAM RNA, and which when bound by VGAM3289 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3289 host target proteins.

[46013] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3289 gene, herein designated VGAM GENE, on one

or more VGAM3289 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46014] It is yet further appreciated that a function of VGAM3289 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3289 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3289 correlate with, and may be deduced from, the identity of the host target genes which VGAM3289 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46015] Nucleotide sequences of the VGAM3289 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3289 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3289 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3289 are further described hereinbelow with reference to Table 1.

[46016] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3289 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46017] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3290 (VGAM3290) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46018] VGAM3290 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3290 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[46019] VGAM3290 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 89. VGAM3290 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46020] VGAM3290 gene, herein designated VGAM GENE, encodes a VGAM3290 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3290 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3290 precursor RNA is designated SEQ ID:73956, and is provided hereinbelow with reference to the sequence listing part.

[46021] VGAM3290 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3290 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46022] An enzyme complex designated DICER COMPLEX, dices the VGAM3290 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3290 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3290 RNA is designated SEQ ID:73957, and is provided hereinbelow with reference to the sequence listing part.

[46023] VGAM3290 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3290 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3290 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46024] VGAM3290 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3290 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3290 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3290 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3290 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46025] The complementary binding of VGAM3290 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3290 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3290 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3290 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46026] It is appreciated that VGAM3290 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3290 host target genes. The mRNA of each one of this plurality of VGAM3290 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3290 RNA, herein designated VGAM RNA, and which when bound by VGAM3290 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3290 host target proteins.

[46027] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3290 gene, herein designated VGAM GENE, on one or more VGAM3290 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46028] It is yet further appreciated that a function of VGAM3290 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3290 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 89. Specific functions, and accordingly utilities, of VGAM3290 correlate with, and may be deduced from, the identity of the host target genes which VGAM3290 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46029] Nucleotide sequences of the VGAM3290 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3290 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3290 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3290 are further described hereinbelow with reference to Table 1.

[46030] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3290 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46031] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3291 (VGAM3291) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46032] VGAM3291 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3291 was detected is described hereinabove with reference to Figs. 2-8.

[46033] VGAM3291 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 84. VGAM3291 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46034] VGAM3291 gene, herein designated VGAM GENE, encodes a VGAM3291 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3291 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3291 precursor RNA is designated SEQ ID:73998, and is provided hereinbelow with reference to the sequence listing part.

[46035] VGAM3291 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3291 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[46036] An enzyme complex designated DICER COMPLEX, dices the VGAM3291 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3291 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3291 RNA is designated SEQ ID:73999, and is provided hereinbelow with reference to the sequence listing part.

[46037] VGAM3291 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3291 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3291 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46038] VGAM3291 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3291 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3291 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3291 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3291 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46039] The complementary binding of VGAM3291 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3291 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3291 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3291 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46040] It is appreciated that VGAM3291 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3291 host target genes. The mRNA of each one of this plurality of VGAM3291 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3291 RNA, herein designated VGAM RNA, and which when bound by VGAM3291 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3291 host target proteins.

[46041] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3291 gene, herein designated VGAM GENE, on one or more VGAM3291 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46042] It is yet further appreciated that a function of VGAM3291 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3291 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 84. Specific functions, and accordingly utilities, of VGAM3291 correlate with, and may be deduced from, the identity of the host target genes which VGAM3291 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46043] Nucleotide sequences of the VGAM3291 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3291 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3291 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3291 are further described hereinbelow with reference to Table 1.

[46044] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3291 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46045] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3292 (VGAM3292) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46046] VGAM3292 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3292 was detected is described hereinabove with reference to Figs. 2-8.

[46047] VGAM3292 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Human herpesvirus 5. VGAM3292 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46048] VGAM3292 gene, herein designated VGAM GENE, encodes a VGAM3292 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3292 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3292 precursor RNA is designated SEQ ID:74030, and is provided hereinbelow with reference to the sequence listing part.

[46049] VGAM3292 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3292 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46050] An enzyme complex designated DICER COMPLEX, dices the VGAM3292 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3292 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3292 RNA is designated SEQ ID:74031, and is provided hereinbelow with reference to the sequence listing part.

[46051] VGAM3292 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3292 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3292 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46052] VGAM3292 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3292 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3292 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3292 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3292 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46053] The complementary binding of VGAM3292 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3292 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3292 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3292 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46054] It is appreciated that VGAM3292 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3292 host target genes. The mRNA of each one of this plurality of VGAM3292 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3292 RNA, herein designated VGAM RNA, and which when bound by VGAM3292 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3292 host target proteins.

[46055] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3292 gene, herein designated VGAM GENE, on one or more VGAM3292 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46056] It is yet further appreciated that a function of VGAM3292 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3292 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3292 correlate with, and may be deduced from, the identity of the host target genes which VGAM3292 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46057] Nucleotide sequences of the VGAM3292 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3292 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3292 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3292 are further described hereinbelow with reference to Table 1.

[46058] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3292 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46059] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3293 (VGAM3293) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46060] VGAM3293 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3293 was detected is described hereinabove with reference to Figs. 2-8.

[46061] VGAM3293 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Broad bean mottle virus.

VGAM3293 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46062] VGAM3293 gene, herein designated VGAM GENE, encodes a VGAM3293 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3293 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3293 precursor RNA is designated SEQ ID:74045, and is provided hereinbelow with reference to the sequence listing part.

[46063] VGAM3293 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3293 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46064] An enzyme complex designated DICER COMPLEX, dices

the VGAM3293 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3293 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3293 RNA is designated SEQ ID:74046, and is provided hereinbelow with reference to the sequence listing part.

[46065] VGAM3293 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3293 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3293 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46066] VGAM3293 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3293 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3293 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3293 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3293 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46067] The complementary binding of VGAM3293 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3293 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3293 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3293 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46068] It is appreciated that VGAM3293 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3293 host target genes. The mRNA of each one of this plurality of VGAM3293 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3293 RNA, herein designated VGAM RNA, and which when bound by VGAM3293 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3293 host target proteins.

[46069] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3293 gene, herein designated VGAM GENE, on one or more VGAM3293 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46070] It is yet further appreciated that a function of VGAM3293 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3293 include diagnosis, prevention and treatment of viral infection by Broad bean mottle virus. Specific functions, and accordingly utilities, of VGAM3293 correlate with, and may be deduced from, the identity of the host target genes which VGAM3293 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46071] Nucleotide sequences of the VGAM3293 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3293 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3293 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3293 are further described hereinbelow with reference to Table 1.

[46072] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3293 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46073] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3294 (VGAM3294) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46074] VGAM3294 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3294 was detected is described hereinabove with reference to Figs. 2-8.

[46075] VGAM3294 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine adenovirus B. VGAM3294 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[46076] VGAM3294 gene, herein designated VGAM GENE, encodes a VGAM3294 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3294 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3294 precursor RNA is designated SEQ ID:74069, and is provided hereinbelow with reference to the sequence listing part.

[46077] VGAM3294 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3294 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46078] An enzyme complex designated DICER COMPLEX, dices the VGAM3294 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3294 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3294 RNA is designated SEQ ID:74070, and is provided hereinbelow with reference to the sequence listing part.

[46079] VGAM3294 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3294 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3294 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46080] VGAM3294 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3294 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3294 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3294 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3294 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46081] The complementary binding of VGAM3294 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3294 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3294

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3294 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46082] It is appreciated that VGAM3294 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3294 host target genes. The mRNA of each one of this plurality of VGAM3294 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3294 RNA, herein designated VGAM RNA, and which when bound by VGAM3294 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3294 host target proteins.

[46083] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3294 gene, herein designated VGAM GENE, on one or more VGAM3294 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46084] It is yet further appreciated that a function of VGAM3294 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3294 include diagnosis, prevention and treatment of viral infection by Bovine adenovirus B. Specific functions, and accordingly utilities, of VGAM3294 correlate with, and may be deduced from, the identity of the host target genes which VGAM3294 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46085] Nucleotide sequences of the VGAM3294 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3294 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3294 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3294 are further described hereinbelow with reference to Table 1.

[46086] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3294 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46087] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3295 (VGAM3295) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46088] VGAM3295 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3295 was detected is described hereinabove with reference to Figs. 2-8.

[46089] VGAM3295 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pepper mottle virus. VGAM3295 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[46090] VGAM3295 gene, herein designated VGAM GENE, encodes a VGAM3295 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3295 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3295 precursor RNA is designated SEQ ID:74079, and is provided hereinbelow with reference to the sequence listing part.

[46091] VGAM3295 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3295 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46092] An enzyme complex designated DICER COMPLEX, dices the VGAM3295 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3295 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3295 RNA is designated SEQ ID:74080, and is provided hereinbelow with reference to the sequence listing part.

[46093] VGAM3295 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3295 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3295 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46094] VGAM3295 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3295 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3295 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3295 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3295 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46095] The complementary binding of VGAM3295 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3295 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3295 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3295 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46096] It is appreciated that VGAM3295 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3295 host target genes. The mRNA of each one of this plurality of VGAM3295 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3295 RNA, herein designated VGAM RNA, and which when bound by VGAM3295 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3295 host target proteins.

[46097] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3295 gene, herein designated VGAM GENE, on one or more VGAM3295 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46098] It is yet further appreciated that a function of VGAM3295 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3295 include diagnosis, prevention and treatment of viral infection by Pepper mottle virus. Specific functions, and accordingly utilities, of VGAM3295 correlate with, and may be deduced from, the identity of the host target genes which VGAM3295 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46099] Nucleotide sequences of the VGAM3295 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3295 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3295 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3295 are further

described hereinbelow with reference to Table 1.

[46100] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3295 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46101] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3296 (VGAM3296) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46102] VGAM3296 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3296 was detected is described hereinabove with reference to Figs. 2-8.

[46103] VGAM3296 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pepper mottle virus. VGAM3296 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46104] VGAM3296 gene, herein designated VGAM GENE, encodes a VGAM3296 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3296 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3296 precursor RNA is designated SEQ ID:74088, and is provided hereinbelow with reference to the sequence listing part.

[46105] VGAM3296 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3296 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46106] An enzyme complex designated DICER COMPLEX, dices the VGAM3296 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3296 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3296 RNA is designated SEQ ID:74089, and is provided hereinbelow with reference to the sequence listing part.

[46107] VGAM3296 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3296 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3296 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46108] VGAM3296 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3296 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3296 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3296 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3296 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46109] The complementary binding of VGAM3296 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3296 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3296 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3296 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46110] It is appreciated that VGAM3296 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3296 host target genes. The mRNA of each one of this plurality of VGAM3296 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3296 RNA, herein designated VGAM RNA, and which when bound by VGAM3296 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3296 host target proteins.

[46111] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3296 gene, herein designated VGAM GENE, on one or more VGAM3296 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46112] It is yet further appreciated that a function of VGAM3296 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3296 include diagnosis, prevention and treatment of viral infection by Pepper mottle virus. Specific functions, and accordingly utilities, of VGAM3296 correlate with, and may be deduced from, the identity of the host target genes which VGAM3296 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46113] Nucleotide sequences of the VGAM3296 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3296 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3296 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3296 are further described hereinbelow with reference to Table 1.

[46114] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3296 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46115] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3297 (VGAM3297) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46116] VGAM3297 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3297 was detected is described hereinabove with reference to Figs. 2-8.

[46117] VGAM3297 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus. VGAM3297 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46118] VGAM3297 gene, herein designated VGAM GENE, encodes

a VGAM3297 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3297 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3297 precursor RNA is designated SEQ ID:74092, and is provided hereinbelow with reference to the sequence listing part.

[46119] VGAM3297 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3297 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46120] An enzyme complex designated DICER COMPLEX, dices the VGAM3297 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3297 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3297 RNA is designated SEQ ID:74093, and is provided hereinbelow with reference to the sequence listing part.

[46121] VGAM3297 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3297 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3297 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46122] VGAM3297 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3297 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3297 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3297 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3297 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46123] The complementary binding of VGAM3297 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3297 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3297 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3297 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[46124] It is appreciated that VGAM3297 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3297 host target genes. The mRNA of each one of this plurality of VGAM3297 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3297 RNA, herein designated VGAM RNA, and which when bound by VGAM3297 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3297 host target proteins.

[46125] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3297 gene, herein designated VGAM GENE, on one or more VGAM3297 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46126] It is yet further appreciated that a function of VGAM3297 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3297 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3297 correlate with, and may be deduced from, the identity of the host target genes which VGAM3297 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46127] Nucleotide sequences of the VGAM3297 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3297 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3297 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3297 are further described hereinbelow with reference to Table 1.

[46128] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3297 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46129] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3298 (VGAM3298) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46130] VGAM3298 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3298 was detected is described hereinabove with reference to Figs. 2-8.

[46131] VGAM3298 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3298 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46132] VGAM3298 gene, herein designated VGAM GENE, encodes a VGAM3298 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3298 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3298 precursor RNA is designated SEQ ID:74107, and is provided hereinbelow with reference to the sequence listing part.

[46133] VGAM3298 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3298 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46134] An enzyme complex designated DICER COMPLEX, dices the VGAM3298 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3298 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3298 RNA is designated SEQ ID:74108, and is provided hereinbelow with reference to the sequence listing part.

[46135] VGAM3298 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3298 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3298 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46136] VGAM3298 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3298 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3298 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3298 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3298 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46137] The complementary binding of VGAM3298 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3298 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3298 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3298 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46138] It is appreciated that VGAM3298 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3298 host target genes. The mRNA of each one of this plurality of VGAM3298 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3298 RNA, herein designated VGAM RNA, and which when bound by VGAM3298 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3298 host target proteins.

[46139] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3298 gene, herein designated VGAM GENE, on one or more VGAM3298 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46140] It is yet further appreciated that a function of VGAM3298 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3298 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3298 correlate with, and may be deduced from, the identity of the host target genes which VGAM3298 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46141] Nucleotide sequences of the VGAM3298 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3298 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3298 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3298 are further described hereinbelow with reference to Table 1.

[46142] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3298 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46143] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3299 (VGAM3299) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46144] VGAM3299 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3299 was detected is described hereinabove with reference to Figs. 2-8.

[46145] VGAM3299 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3299 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46146] VGAM3299 gene, herein designated VGAM GENE, encodes a VGAM3299 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3299 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3299 precursor RNA is designated SEQ ID:74115, and is provided hereinbelow with reference to the sequence listing part.

[46147] VGAM3299 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3299 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46148] An enzyme complex designated DICER COMPLEX, dices the VGAM3299 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3299 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3299 RNA is designated SEQ ID:74116, and is provided hereinbelow with reference to the sequence listing part.

[46149] VGAM3299 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3299 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3299 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46150] VGAM3299 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3299 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3299 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3299 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3299 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46151] The complementary binding of VGAM3299 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3299 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3299 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3299 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46152] It is appreciated that VGAM3299 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3299 host target genes. The mRNA of each one of this plurality of VGAM3299 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3299 RNA, herein designated VGAM RNA, and which when bound by VGAM3299 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3299 host target proteins.

[46153] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3299 gene, herein designated VGAM GENE, on one or more VGAM3299 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46154] It is yet further appreciated that a function of VGAM3299 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3299 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3299 correlate with, and may be deduced from, the identity of the host target genes which VGAM3299 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46155] Nucleotide sequences of the VGAM3299 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3299 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3299 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3299 are further described hereinbelow with reference to Table 1.

[46156] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3299 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46157] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3300 (VGAM3300) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46158] VGAM3300 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3300 was detected is described hereinabove with reference to Figs. 2–8.

[46159] VGAM3300 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Mouse parvovirus 1. VGAM3300 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46160] VGAM3300 gene, herein designated VGAM GENE, encodes a VGAM3300 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3300 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3300 precursor RNA is designated SEQ ID:74124, and is provided hereinbelow with reference to the sequence listing part.

[46161] VGAM3300 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3300 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46162] An enzyme complex designated DICER COMPLEX, dices the VGAM3300 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3300 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3300 RNA is designated SEQ ID:74125, and is provided hereinbelow with reference to the sequence listing part.

[46163] VGAM3300 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3300 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3300 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46164] VGAM3300 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3300 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3300 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3300 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3300 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46165] The complementary binding of VGAM3300 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3300 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3300 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3300 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46166] It is appreciated that VGAM3300 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3300 host target genes. The mRNA of each one of this plurality of VGAM3300 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3300 RNA, herein designated VGAM RNA, and which when bound by VGAM3300 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3300 host target proteins.

[46167] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3300 gene, herein designated VGAM GENE, on one or more VGAM3300 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [46168] It is yet further appreciated that a function of VGAM3300 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3300 include diagnosis, prevention and treatment of viral infection by Mouse parvovirus 1. Specific functions, and accordingly utilities, of VGAM3300 correlate with, and may be deduced from, the identity of the host target genes which VGAM3300 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [46169] Nucleotide sequences of the VGAM3300 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3300 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3300 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3300 are further described hereinbelow with reference to Table 1.
- [46170] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3300 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46171] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3301 (VGAM3301) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46172] VGAM3301 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3301 was detected is described hereinabove with reference to Figs. 2-8.

[46173] VGAM3301 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6B. VGAM3301 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46174] VGAM3301 gene, herein designated VGAM GENE, encodes a VGAM3301 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3301 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3301 precursor RNA is designated SEQ ID:74153, and is provided hereinbelow with reference to the sequence listing part.

[46175] VGAM3301 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3301 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46176] An enzyme complex designated DICER COMPLEX, dices the VGAM3301 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3301 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3301 RNA is designated SEQ ID:74154, and is provided hereinbelow with reference to the sequence listing part.

[46177] VGAM3301 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3301 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3301 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46178] VGAM3301 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3301 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3301 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3301 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3301 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46179] The complementary binding of VGAM3301 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3301 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3301 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3301 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46180] It is appreciated that VGAM3301 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3301 host target genes. The mRNA of

each one of this plurality of VGAM3301 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3301 RNA, herein designated VGAM RNA, and which when bound by VGAM3301 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3301 host target proteins.

[46181] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3301 gene, herein designated VGAM GENE, on one or more VGAM3301 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[46182] It is yet further appreciated that a function of VGAM3301 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3301 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6B. Specific functions, and accordingly utilities, of VGAM3301 correlate with, and may be deduced from, the identity of the host target genes which VGAM3301 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46183] Nucleotide sequences of the VGAM3301 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3301 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3301 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3301 are further described hereinbelow with reference to Table 1.

[46184] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3301 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[46185] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3302 (VGAM3302) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46186] VGAM3302 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3302 was detected is described hereinabove with reference to Figs. 2–8.

[46187] VGAM3302 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 8. VGAM3302 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46188] VGAM3302 gene, herein designated VGAM GENE, encodes a VGAM3302 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3302 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3302 precursor RNA is designated SEQ ID:74160, and is provided hereinbelow with reference to the sequence listing part.

[46189] VGAM3302 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3302 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46190] An enzyme complex designated DICER COMPLEX, dices the VGAM3302 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3302 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3302 RNA is designated SEQ ID:74161,

and is provided hereinbelow with reference to the sequence listing part.

[46191] VGAM3302 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3302 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3302 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46192] VGAM3302 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3302 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3302 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3302 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3302 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46193] The complementary binding of VGAM3302 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3302 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3302 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3302 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46194] It is appreciated that VGAM3302 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3302 host target genes. The mRNA of each one of this plurality of VGAM3302 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3302 RNA, herein designated VGAM RNA, and which when bound by VGAM3302 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3302 host target proteins.

[46195] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3302 gene, herein designated VGAM GENE, on one or more VGAM3302 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46196] It is yet further appreciated that a function of VGAM3302 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3302 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 8. Specific functions, and accordingly utilities, of VGAM3302 correlate with, and may be deduced from, the identity of the host target genes which VGAM3302 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46197] Nucleotide sequences of the VGAM3302 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3302 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3302 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3302 are further described hereinbelow with reference to Table 1.

[46198] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3302 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46199] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3303 (VGAM3303) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46200] VGAM3303 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3303 was detected is described hereinabove with reference to Figs. 2–8.

[46201] VGAM3303 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Murid herpesvirus 4. VGAM3303 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46202] VGAM3303 gene, herein designated VGAM GENE, encodes a VGAM3303 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3303 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3303 precu-

sor RNA is designated SEQ ID:74170, and is provided hereinbelow with reference to the sequence listing part.

[46203] VGAM3303 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3303 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46204] An enzyme complex designated DICER COMPLEX, dices the VGAM3303 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3303 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3303 RNA is designated SEQ ID:74171, and is provided hereinbelow with reference to the se-

quence listing part.

[46205] VGAM3303 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3303 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3303 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46206] VGAM3303 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3303 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3303 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3303 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3303 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46207] The complementary binding of VGAM3303 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3303 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3303 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3303 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46208] It is appreciated that VGAM3303 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3303 host target genes. The mRNA of each one of this plurality of VGAM3303 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3303 RNA, herein designated VGAM RNA, and which when bound by VGAM3303 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3303 host target proteins.

[46209] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3303 gene, herein designated VGAM GENE, on one or more VGAM3303 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46210] It is yet further appreciated that a function of VGAM3303

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3303 include diagnosis, prevention and treatment of viral infection by Murid herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3303 correlate with, and may be deduced from, the identity of the host target genes which VGAM3303 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46211] Nucleotide sequences of the VGAM3303 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3303 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3303 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3303 are further described hereinbelow with reference to Table 1.

[46212] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3303 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46213] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3304 (VGAM3304) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46214] VGAM3304 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3304 was detected is described hereinabove with reference to Figs. 2–8.

[46215] VGAM3304 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Murid herpesvirus 4. VGAM3304 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46216] VGAM3304 gene, herein designated VGAM GENE, encodes a VGAM3304 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3304 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3304 precursor RNA is designated SEQ ID:74205, and is provided

hereinbelow with reference to the sequence listing part.

[46217] VGAM3304 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3304 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46218] An enzyme complex designated DICER COMPLEX, dices the VGAM3304 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3304 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3304 RNA is designated SEQ ID:74206, and is provided hereinbelow with reference to the sequence listing part.

[46219] VGAM3304 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3304 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3304 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46220] VGAM3304 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3304 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3304 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3304 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3304 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46221] The complementary binding of VGAM3304 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3304 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3304 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3304 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46222] It is appreciated that VGAM3304 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3304 host target genes. The mRNA of each one of this plurality of VGAM3304 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3304 RNA, herein designated VGAM RNA, and which when bound by VGAM3304 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3304 host target proteins.

[46223] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3304 gene, herein designated VGAM GENE, on one or more VGAM3304 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46224] It is yet further appreciated that a function of VGAM3304 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3304 include diagnosis, prevention and treatment of viral infection by Murid herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3304 correlate with, and may be deduced from, the identity of the host target genes which VGAM3304 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46225] Nucleotide sequences of the VGAM3304 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3304 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3304 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3304 are further described hereinbelow with reference to Table 1.

[46226] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3304 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46227] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3305 (VGAM3305) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46228] VGAM3305 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3305 was detected is described hereinabove with reference to Figs. 2–8.

[46229] VGAM3305 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Parvovirus H1. VGAM3305 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46230] VGAM3305 gene, herein designated VGAM GENE, encodes a VGAM3305 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3305 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3305 precursor RNA is designated SEQ ID:74238, and is provided hereinbelow with reference to the sequence listing part.

[46231] VGAM3305 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3305 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46232] An enzyme complex designated DICER COMPLEX, dices the VGAM3305 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3305 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3305 RNA is designated SEQ ID:74239, and is provided hereinbelow with reference to the sequence listing part.

[46233] VGAM3305 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3305 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3305 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46234] VGAM3305 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3305 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3305 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3305 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3305 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46235] The complementary binding of VGAM3305 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3305 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3305 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3305 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46236] It is appreciated that VGAM3305 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3305 host target genes. The mRNA of each one of this plurality of VGAM3305 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3305 RNA, herein designated VGAM

RNA, and which when bound by VGAM3305 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3305 host target proteins.

[46237] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3305 gene, herein designated VGAM GENE, on one or more VGAM3305 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46238] It is yet further appreciated that a function of VGAM3305 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3305 include diagnosis, prevention and treatment of viral infection by Parvovirus H1. Specific functions, and accordingly utilities, of VGAM3305 correlate with, and may be deduced from, the identity of the host target genes which VGAM3305 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46239] Nucleotide sequences of the VGAM3305 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3305 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3305 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3305 are further described hereinbelow with reference to Table 1.

[46240] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3305 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46241] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3306 (VGAM3306) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46242] VGAM3306 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3306 was detected is described hereinabove with reference to Figs. 2-8.

[46243] VGAM3306 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Parvovirus H1. VGAM3306 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46244] VGAM3306 gene, herein designated VGAM GENE, encodes a VGAM3306 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3306 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3306 precursor RNA is designated SEQ ID:74256, and is provided hereinbelow with reference to the sequence listing part.

[46245] VGAM3306 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3306 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46246] An enzyme complex designated DICER COMPLEX, dices the VGAM3306 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3306 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3306 RNA is designated SEQ ID:74257, and is provided hereinbelow with reference to the sequence listing part.

[46247] VGAM3306 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3306 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3306 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46248] VGAM3306 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3306 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3306 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3306 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3306 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46249] The complementary binding of VGAM3306 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3306 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3306 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3306 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46250] It is appreciated that VGAM3306 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3306 host target genes. The mRNA of each one of this plurality of VGAM3306 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3306 RNA, herein designated VGAM RNA, and which when bound by VGAM3306 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3306 host target proteins.

[46251] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3306 gene, herein designated VGAM GENE, on one or more VGAM3306 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46252] It is yet further appreciated that a function of VGAM3306 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3306 include diagnosis, prevention and

treatment of viral infection by Parvovirus H1. Specific functions, and accordingly utilities, of VGAM3306 correlate with, and may be deduced from, the identity of the host target genes which VGAM3306 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46253] Nucleotide sequences of the VGAM3306 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3306 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3306 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3306 are further described hereinbelow with reference to Table 1.

[46254] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3306 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46255] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3307 (VGAM3307) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46256] VGAM3307 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3307 was detected is described hereinabove with reference to Figs. 2–8.

[46257] VGAM3307 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3307 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46258] VGAM3307 gene, herein designated VGAM GENE, encodes a VGAM3307 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3307 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3307 precursor RNA is designated SEQ ID:74286, and is provided hereinbelow with reference to the sequence listing part.

[46259] VGAM3307 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3307 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46260] An enzyme complex designated DICER COMPLEX, dices the VGAM3307 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3307 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3307 RNA is designated SEQ ID:74287, and is provided hereinbelow with reference to the sequence listing part.

[46261] VGAM3307 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3307 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3307 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46262] VGAM3307 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3307 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3307 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3307 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3307 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46263] The complementary binding of VGAM3307 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3307 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3307 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3307 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46264] It is appreciated that VGAM3307 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3307 host target genes. The mRNA of each one of this plurality of VGAM3307 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3307 RNA, herein designated VGAM RNA, and which when bound by VGAM3307 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3307 host target proteins.

[46265] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3307 gene, herein designated VGAM GENE, on one or more VGAM3307 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46266] It is yet further appreciated that a function of VGAM3307 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3307 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria

Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3307 correlate with, and may be deduced from, the identity of the host target genes which VGAM3307 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46267] Nucleotide sequences of the VGAM3307 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3307 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3307 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3307 are further described hereinbelow with reference to Table 1.

[46268] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3307 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46269] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3308 (VGAM3308) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[46270] VGAM3308 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3308 was detected is described hereinabove with reference to Figs. 2–8.

[46271] VGAM3308 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3308 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46272] VGAM3308 gene, herein designated VGAM GENE, encodes a VGAM3308 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3308 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3308 precursor RNA is designated SEQ ID:74330, and is provided hereinbelow with reference to the sequence listing part.

[46273] VGAM3308 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3308 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46274] An enzyme complex designated DICER COMPLEX, dices the VGAM3308 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3308 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3308 RNA is designated SEQ ID:74331, and is provided hereinbelow with reference to the sequence listing part.

[46275] VGAM3308 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3308 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3308 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46276] VGAM3308 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3308 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3308 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3308 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3308 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46277] The complementary binding of VGAM3308 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3308 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3308 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3308 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46278] It is appreciated that VGAM3308 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3308 host target genes. The mRNA of each one of this plurality of VGAM3308 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3308 RNA, herein designated VGAM RNA, and which when bound by VGAM3308 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3308 host target proteins.

[46279] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3308 gene, herein designated VGAM GENE, on one or more VGAM3308 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46280] It is yet further appreciated that a function of VGAM3308 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3308 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utili-

ties, of VGAM3308 correlate with, and may be deduced from, the identity of the host target genes which VGAM3308 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46281] Nucleotide sequences of the VGAM3308 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3308 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3308 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3308 are further described hereinbelow with reference to Table 1.

[46282] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3308 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46283] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3309 (VGAM3309) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[46284] VGAM3309 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3309 was detected is described hereinabove with reference to Figs. 2–8.

[46285] VGAM3309 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rous sarcoma virus. VGAM3309 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46286] VGAM3309 gene, herein designated VGAM GENE, encodes a VGAM3309 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3309 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3309 precursor RNA is designated SEQ ID:74349, and is provided hereinbelow with reference to the sequence listing part.

[46287] VGAM3309 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3309 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46288] An enzyme complex designated DICER COMPLEX, dices the VGAM3309 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3309 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3309 RNA is designated SEQ ID:74350, and is provided hereinbelow with reference to the sequence listing part.

[46289] VGAM3309 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3309 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3309 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46290] VGAM3309 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3309 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3309 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3309 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3309 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46291] The complementary binding of VGAM3309 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3309 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3309 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3309 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46292] It is appreciated that VGAM3309 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3309 host target genes. The mRNA of each one of this plurality of VGAM3309 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3309 RNA, herein designated VGAM RNA, and which when bound by VGAM3309 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3309 host target proteins.

[46293] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3309 gene, herein designated VGAM GENE, on one or more VGAM3309 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46294] It is yet further appreciated that a function of VGAM3309 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3309 include diagnosis, prevention and treatment of viral infection by Rous sarcoma virus. Specific functions, and accordingly utilities, of VGAM3309 correlate with, and may be deduced from, the identity of the

host target genes which VGAM3309 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46295] Nucleotide sequences of the VGAM3309 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3309 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3309 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3309 are further described hereinbelow with reference to Table 1.

[46296] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3309 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46297] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3310 (VGAM3310) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46298] VGAM3310 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3310 was detected is described hereinabove with reference to Figs. 2–8.

[46299] VGAM3310 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3310 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46300] VGAM3310 gene, herein designated VGAM GENE, encodes a VGAM3310 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3310 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3310 precursor RNA is designated SEQ ID:74360, and is provided hereinbelow with reference to the sequence listing part.

[46301] VGAM3310 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3310 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46302] An enzyme complex designated DICER COMPLEX, dices the VGAM3310 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3310 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3310 RNA is designated SEQ ID:74361, and is provided hereinbelow with reference to the sequence listing part.

[46303] VGAM3310 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3310 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3310 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46304] VGAM3310 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3310 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3310 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3310 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3310 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46305] The complementary binding of VGAM3310 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3310 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3310 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3310 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46306] It is appreciated that VGAM3310 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3310 host target genes. The mRNA of each one of this plurality of VGAM3310 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3310 RNA, herein designated VGAM RNA, and which when bound by VGAM3310 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3310 host target proteins.

[46307] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3310 gene, herein designated VGAM GENE, on one or more VGAM3310 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46308] It is yet further appreciated that a function of VGAM3310 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3310 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3310 correlate with, and may be deduced from, the identity of the host target genes which VGAM3310 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[46309] Nucleotide sequences of the VGAM3310 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3310 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3310 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3310 are further described hereinbelow with reference to Table 1.

[46310] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3310 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46311] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3311 (VGAM3311) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46312] VGAM3311 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3311 was detected is described hereinabove with reference to Figs. 2–8.

[46313] VGAM3311 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3311 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46314] VGAM3311 gene, herein designated VGAM GENE, encodes a VGAM3311 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3311 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3311 precursor RNA is designated SEQ ID:74385, and is provided hereinbelow with reference to the sequence listing part.

[46315] VGAM3311 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3311 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46316] An enzyme complex designated DICER COMPLEX, dices the VGAM3311 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3311 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3311 RNA is designated SEQ ID:74386, and is provided hereinbelow with reference to the sequence listing part.

[46317] VGAM3311 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3311 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3311 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46318] VGAM3311 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3311 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3311 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3311 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3311 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[46319] The complementary binding of VGAM3311 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3311 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3311 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3311 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46320] It is appreciated that VGAM3311 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3311 host target genes. The mRNA of each one of this plurality of VGAM3311 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3311 RNA, herein designated VGAM RNA, and which when bound by VGAM3311 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3311 host target proteins.

[46321] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3311 gene, herein designated VGAM GENE, on one or more VGAM3311 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46322] It is yet further appreciated that a function of VGAM3311 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3311 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3311 correlate with, and may be deduced from, the identity of the host target genes which VGAM3311 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[46323] Nucleotide sequences of the VGAM3311 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3311 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3311 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3311 are further described hereinbelow with reference to Table 1.

[46324] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3311 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46325] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3312 (VGAM3312) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46326] VGAM3312 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3312 was detected is described hereinabove with reference to Figs. 2–8.

[46327] VGAM3312 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Red clover mottle virus. VGAM3312 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46328] VGAM3312 gene, herein designated VGAM GENE, encodes a VGAM3312 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3312 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3312 precursor RNA is designated SEQ ID:74440, and is provided hereinbelow with reference to the sequence listing part.

[46329] VGAM3312 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3312 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46330] An enzyme complex designated DICER COMPLEX, dices the VGAM3312 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3312 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3312 RNA is designated SEQ ID:74441, and is provided hereinbelow with reference to the sequence listing part.

[46331] VGAM3312 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3312 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3312 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[46332] VGAM3312 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3312 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3312 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3312 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3312 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46333] The complementary binding of VGAM3312 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3312 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3312 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3312 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46334] It is appreciated that VGAM3312 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3312 host target genes. The mRNA of each one of this plurality of VGAM3312 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3312 RNA, herein designated VGAM RNA, and which when bound by VGAM3312 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3312 host target proteins.

[46335] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3312 gene, herein designated VGAM GENE, on one

or more VGAM3312 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46336] It is yet further appreciated that a function of VGAM3312 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3312 include diagnosis, prevention and treatment of viral infection by Red clover mottle virus. Specific functions, and accordingly utilities, of VGAM3312 correlate with, and may be deduced from, the identity of the host target genes which VGAM3312 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46337] Nucleotide sequences of the VGAM3312 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3312 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3312 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3312 are further described hereinbelow with reference to Table 1.

[46338] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3312 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46339] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3313 (VGAM3313) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46340] VGAM3313 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3313 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[46341] VGAM3313 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3313 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46342] VGAM3313 gene, herein designated VGAM GENE, encodes a VGAM3313 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3313 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3313 precursor RNA is designated SEQ ID:74452, and is provided hereinbelow with reference to the sequence listing part.

[46343] VGAM3313 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3313 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46344] An enzyme complex designated DICER COMPLEX, dices the VGAM3313 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3313 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3313 RNA is designated SEQ ID:74453, and is provided hereinbelow with reference to the sequence listing part.

[46345] VGAM3313 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3313 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3313 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46346] VGAM3313 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3313 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3313 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3313 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3313 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46347] The complementary binding of VGAM3313 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3313 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3313 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3313 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46348] It is appreciated that VGAM3313 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3313 host target genes. The mRNA of each one of this plurality of VGAM3313 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3313 RNA, herein designated VGAM RNA, and which when bound by VGAM3313 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3313 host target proteins.

[46349] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3313 gene, herein designated VGAM GENE, on one or more VGAM3313 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46350] It is yet further appreciated that a function of VGAM3313 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3313 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3313 correlate with, and may be deduced from, the identity of the host target genes which VGAM3313 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46351] Nucleotide sequences of the VGAM3313 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3313 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3313 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3313 are further described hereinbelow with reference to Table 1.

[46352] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3313 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46353] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3314 (VGAM3314) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46354] VGAM3314 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3314 was detected is described hereinabove with reference to Figs. 2-8.

[46355] VGAM3314 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ovine pulmonary adenocarcinoma virus. VGAM3314 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46356] VGAM3314 gene, herein designated VGAM GENE, encodes a VGAM3314 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3314 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3314 precursor RNA is designated SEQ ID:74457, and is provided hereinbelow with reference to the sequence listing part.

[46357] VGAM3314 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3314 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[46358] An enzyme complex designated DICER COMPLEX, dices the VGAM3314 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3314 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3314 RNA is designated SEQ ID:74458, and is provided hereinbelow with reference to the sequence listing part.

[46359] VGAM3314 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3314 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3314 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46360] VGAM3314 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3314 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3314 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3314 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3314 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46361] The complementary binding of VGAM3314 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3314 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3314 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3314 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46362] It is appreciated that VGAM3314 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3314 host target genes. The mRNA of each one of this plurality of VGAM3314 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3314 RNA, herein designated VGAM RNA, and which when bound by VGAM3314 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3314 host target proteins.

[46363] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3314 gene, herein designated VGAM GENE, on one or more VGAM3314 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46364] It is yet further appreciated that a function of VGAM3314 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3314 include diagnosis, prevention and treatment of viral infection by Ovine pulmonary adenocarcinoma virus. Specific functions, and accordingly utilities, of VGAM3314 correlate with, and may be deduced from, the identity of the host target genes which VGAM3314 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46365] Nucleotide sequences of the VGAM3314 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3314 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3314 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3314 are further described hereinbelow with reference to Table 1.

[46366] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3314 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46367] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3315 (VGAM3315) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46368] VGAM3315 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3315 was detected is described hereinabove with reference to Figs. 2-8.

[46369] VGAM3315 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Cowpox virus.

VGAM3315 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46370] VGAM3315 gene, herein designated VGAM GENE, encodes a VGAM3315 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3315 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3315 precursor RNA is designated SEQ ID:74472, and is provided hereinbelow with reference to the sequence listing part.

[46371] VGAM3315 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3315 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46372] An enzyme complex designated DICER COMPLEX, dices the VGAM3315 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3315 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3315 RNA is designated SEQ ID:74473, and is provided hereinbelow with reference to the sequence listing part.

[46373] VGAM3315 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3315 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3315 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46374] VGAM3315 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3315 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3315 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3315 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3315 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46375] The complementary binding of VGAM3315 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3315 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3315 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3315 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46376] It is appreciated that VGAM3315 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3315 host target genes. The mRNA of each one of this plurality of VGAM3315 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3315 RNA, herein designated VGAM RNA, and which when bound by VGAM3315 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3315 host target proteins.

[46377] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3315 gene, herein designated VGAM GENE, on one or more VGAM3315 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46378] It is yet further appreciated that a function of VGAM3315 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3315 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3315 correlate with, and may be deduced from, the identity of the host target genes which VGAM3315 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46379] Nucleotide sequences of the VGAM3315 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3315 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3315 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3315 are further described hereinbelow with reference to Table 1.

[46380] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3315 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46381] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3316 (VGAM3316) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46382] VGAM3316 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3316 was detected is described hereinabove with reference to Figs. 2-8.

[46383] VGAM3316 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3316 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46384] VGAM3316 gene, herein designated VGAM GENE, encodes a VGAM3316 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3316 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3316 precursor RNA is designated SEQ ID:74478, and is provided hereinbelow with reference to the sequence listing part.

[46385] VGAM3316 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3316 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46386] An enzyme complex designated DICER COMPLEX, dices

the VGAM3316 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3316 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3316 RNA is designated SEQ ID:74479, and is provided hereinbelow with reference to the sequence listing part.

[46387] VGAM3316 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3316 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3316 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46388] VGAM3316 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3316 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3316 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3316 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3316 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46389] The complementary binding of VGAM3316 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3316 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3316 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3316 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46390] It is appreciated that VGAM3316 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3316 host target genes. The mRNA of each one of this plurality of VGAM3316 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3316 RNA, herein designated VGAM RNA, and which when bound by VGAM3316 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3316 host target proteins.

[46391] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3316 gene, herein designated VGAM GENE, on one or more VGAM3316 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46392] It is yet further appreciated that a function of VGAM3316 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3316 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3316 correlate with, and may be deduced from, the identity of the host target genes which VGAM3316 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46393] Nucleotide sequences of the VGAM3316 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3316 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3316 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3316 are further described hereinbelow with reference to Table 1.

[46394] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3316 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46395] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3317 (VGAM3317) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46396] VGAM3317 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3317 was detected is described hereinabove with reference to Figs. 2-8.

[46397] VGAM3317 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 86. VGAM3317 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46398] VGAM3317 gene, herein designated VGAM GENE, encodes a VGAM3317 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3317 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3317 precursor RNA is designated SEQ ID:74490, and is provided hereinbelow with reference to the sequence listing part.

[46399] VGAM3317 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3317 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46400] An enzyme complex designated DICER COMPLEX, dices the VGAM3317 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3317 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3317 RNA is designated SEQ ID:74491, and is provided hereinbelow with reference to the sequence listing part.

[46401] VGAM3317 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3317 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3317 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46402] VGAM3317 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3317 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3317 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3317 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3317 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46403] The complementary binding of VGAM3317 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3317 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3317

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3317 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46404] It is appreciated that VGAM3317 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3317 host target genes. The mRNA of each one of this plurality of VGAM3317 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3317 RNA, herein designated VGAM RNA, and which when bound by VGAM3317 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3317 host target proteins.

[46405] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3317 gene, herein designated VGAM GENE, on one or more VGAM3317 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46406] It is yet further appreciated that a function of VGAM3317 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3317 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 86. Specific functions, and accordingly utilities, of VGAM3317 correlate with, and may be deduced from, the identity of the host target genes which VGAM3317 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46407] Nucleotide sequences of the VGAM3317 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3317 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3317 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3317 are further described hereinbelow with reference to Table 1.

[46408] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3317 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46409] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3318 (VGAM3318) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46410] VGAM3318 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3318 was detected is described hereinabove with reference to Figs. 2-8.

[46411] VGAM3318 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Leek white stripe virus. VGAM3318 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[46412] VGAM3318 gene, herein designated VGAM GENE, encodes a VGAM3318 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3318 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3318 precursor RNA is designated SEQ ID:74526, and is provided hereinbelow with reference to the sequence listing part.

[46413] VGAM3318 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3318 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46414] An enzyme complex designated DICER COMPLEX, dices the VGAM3318 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3318 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3318 RNA is designated SEQ ID:74527, and is provided hereinbelow with reference to the sequence listing part.

[46415] VGAM3318 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3318 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3318 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46416] VGAM3318 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3318 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3318 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3318 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3318 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46417] The complementary binding of VGAM3318 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3318 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3318 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3318 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46418] It is appreciated that VGAM3318 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3318 host target genes. The mRNA of each one of this plurality of VGAM3318 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3318 RNA, herein designated VGAM RNA, and which when bound by VGAM3318 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3318 host target proteins.

[46419] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3318 gene, herein designated VGAM GENE, on one or more VGAM3318 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46420] It is yet further appreciated that a function of VGAM3318 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3318 include diagnosis, prevention and treatment of viral infection by Leek white stripe virus. Specific functions, and accordingly utilities, of VGAM3318 correlate with, and may be deduced from, the identity of the host target genes which VGAM3318 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46421] Nucleotide sequences of the VGAM3318 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3318 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3318 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3318 are further

described hereinbelow with reference to Table 1.

[46422] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3318 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46423] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3319 (VGAM3319) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46424] VGAM3319 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3319 was detected is described hereinabove with reference to Figs. 2-8.

[46425] VGAM3319 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Raspberry bushy dwarf virus. VGAM3319 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46426] VGAM3319 gene, herein designated VGAM GENE, encodes a VGAM3319 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3319 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3319 precursor RNA is designated SEQ ID:74532, and is provided hereinbelow with reference to the sequence listing part.

[46427] VGAM3319 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3319 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46428] An enzyme complex designated DICER COMPLEX, dices the VGAM3319 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3319 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3319 RNA is designated SEQ ID:74533, and is provided hereinbelow with reference to the sequence listing part.

[46429] VGAM3319 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3319 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3319 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46430] VGAM3319 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3319 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3319 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3319 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3319 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46431] The complementary binding of VGAM3319 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3319 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3319 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3319 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46432] It is appreciated that VGAM3319 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3319 host target genes. The mRNA of each one of this plurality of VGAM3319 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3319 RNA, herein designated VGAM RNA, and which when bound by VGAM3319 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3319 host target proteins.

[46433] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3319 gene, herein designated VGAM GENE, on one or more VGAM3319 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46434] It is yet further appreciated that a function of VGAM3319 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3319 include diagnosis, prevention and treatment of viral infection by Raspberry bushy dwarf virus. Specific functions, and accordingly utilities, of VGAM3319 correlate with, and may be deduced from, the identity of the host target genes which VGAM3319 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46435] Nucleotide sequences of the VGAM3319 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3319 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3319 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3319 are further described hereinbelow with reference to Table 1.

[46436] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3319 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46437] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3320 (VGAM3320) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46438] VGAM3320 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3320 was detected is described hereinabove with reference to Figs. 2-8.

[46439] VGAM3320 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Potato aucuba mosaic virus. VGAM3320 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46440] VGAM3320 gene, herein designated VGAM GENE, encodes

a VGAM3320 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3320 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3320 precursor RNA is designated SEQ ID:74569, and is provided hereinbelow with reference to the sequence listing part.

[46441] VGAM3320 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3320 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46442] An enzyme complex designated DICER COMPLEX, dices the VGAM3320 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3320 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3320 RNA is designated SEQ ID:74570, and is provided hereinbelow with reference to the sequence listing part.

[46443] VGAM3320 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3320 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3320 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46444] VGAM3320 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3320 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3320 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3320 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3320 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46445] The complementary binding of VGAM3320 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3320 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3320 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3320 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[46446] It is appreciated that VGAM3320 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3320 host target genes. The mRNA of each one of this plurality of VGAM3320 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3320 RNA, herein designated VGAM RNA, and which when bound by VGAM3320 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3320 host target proteins.

[46447] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3320 gene, herein designated VGAM GENE, on one or more VGAM3320 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46448] It is yet further appreciated that a function of VGAM3320 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3320 include diagnosis, prevention and treatment of viral infection by Potato aucuba mosaic virus. Specific functions, and accordingly utilities, of VGAM3320 correlate with, and may be deduced from, the identity of the host target genes which VGAM3320 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46449] Nucleotide sequences of the VGAM3320 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3320 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3320 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3320 are further described hereinbelow with reference to Table 1.

[46450] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3320 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46451] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3321 (VGAM3321) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46452] VGAM3321 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3321 was detected is described hereinabove with reference to Figs. 2-8.

[46453] VGAM3321 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Potato aucuba mosaic virus. VGAM3321 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46454] VGAM3321 gene, herein designated VGAM GENE, encodes a VGAM3321 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3321 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3321 precursor RNA is designated SEQ ID:74701, and is provided hereinbelow with reference to the sequence listing part.

[46455] VGAM3321 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3321 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46456] An enzyme complex designated DICER COMPLEX, dices the VGAM3321 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3321 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3321 RNA is designated SEQ ID:74702, and is provided hereinbelow with reference to the sequence listing part.

[46457] VGAM3321 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3321 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3321 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46458] VGAM3321 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3321 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3321 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3321 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3321 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46459] The complementary binding of VGAM3321 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3321 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3321 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3321 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46460] It is appreciated that VGAM3321 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3321 host target genes. The mRNA of each one of this plurality of VGAM3321 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3321 RNA, herein designated VGAM RNA, and which when bound by VGAM3321 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3321 host target proteins.

[46461] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3321 gene, herein designated VGAM GENE, on one or more VGAM3321 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46462] It is yet further appreciated that a function of VGAM3321 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3321 include diagnosis, prevention and treatment of viral infection by Potato aucuba mosaic virus. Specific functions, and accordingly utilities, of VGAM3321 correlate with, and may be deduced from, the identity of the host target genes which VGAM3321 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46463] Nucleotide sequences of the VGAM3321 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3321 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3321 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3321 are further described hereinbelow with reference to Table 1.

[46464] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3321 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46465] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3322 (VGAM3322) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46466] VGAM3322 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3322 was detected is described hereinabove with reference to Figs. 2-8.

[46467] VGAM3322 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lumpy skin disease virus. VGAM3322 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46468] VGAM3322 gene, herein designated VGAM GENE, encodes a VGAM3322 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3322 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3322 precursor RNA is designated SEQ ID:74716, and is provided hereinbelow with reference to the sequence listing part.

[46469] VGAM3322 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3322 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46470] An enzyme complex designated DICER COMPLEX, dices the VGAM3322 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3322 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3322 RNA is designated SEQ ID:74717, and is provided hereinbelow with reference to the sequence listing part.

[46471] VGAM3322 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3322 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3322 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46472] VGAM3322 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3322 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3322 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3322 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3322 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46473] The complementary binding of VGAM3322 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3322 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3322 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3322 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46474] It is appreciated that VGAM3322 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3322 host target genes. The mRNA of each one of this plurality of VGAM3322 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3322 RNA, herein designated VGAM RNA, and which when bound by VGAM3322 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3322 host target proteins.

[46475] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3322 gene, herein designated VGAM GENE, on one or more VGAM3322 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46476] It is yet further appreciated that a function of VGAM3322 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3322 include diagnosis, prevention and treatment of viral infection by Lumpy skin disease virus. Specific functions, and accordingly utilities, of VGAM3322 correlate with, and may be deduced from, the identity of the host target genes which VGAM3322 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46477] Nucleotide sequences of the VGAM3322 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3322 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3322 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3322 are further described hereinbelow with reference to Table 1.

[46478] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3322 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46479] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3323 (VGAM3323) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46480] VGAM3323 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3323 was detected is described hereinabove with reference to Figs. 2–8.

[46481] VGAM3323 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human parainfluenza virus 2. VGAM3323 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46482] VGAM3323 gene, herein designated VGAM GENE, encodes a VGAM3323 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3323 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3323 precursor RNA is designated SEQ ID:74719, and is provided hereinbelow with reference to the sequence listing part.

[46483] VGAM3323 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3323 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46484] An enzyme complex designated DICER COMPLEX, dices the VGAM3323 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3323 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3323 RNA is designated SEQ ID:74720, and is provided hereinbelow with reference to the sequence listing part.

[46485] VGAM3323 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3323 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3323 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46486] VGAM3323 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3323 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3323 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3323 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3323 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46487] The complementary binding of VGAM3323 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3323 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3323 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3323 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46488] It is appreciated that VGAM3323 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3323 host target genes. The mRNA of each one of this plurality of VGAM3323 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3323 RNA, herein designated VGAM RNA, and which when bound by VGAM3323 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3323 host target proteins.

[46489] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3323 gene, herein designated VGAM GENE, on one or more VGAM3323 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[46490] It is yet further appreciated that a function of VGAM3323 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3323 include diagnosis, prevention and treatment of viral infection by Human parainfluenza virus 2. Specific functions, and accordingly utilities, of VGAM3323 correlate with, and may be deduced from, the identity of the host target genes which VGAM3323 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46491] Nucleotide sequences of the VGAM3323 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3323 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3323 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3323 are further described hereinbelow with reference to Table 1.

[46492] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3323 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46493] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3324 (VGAM3324) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46494] VGAM3324 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3324 was detected is described hereinabove with reference to Figs. 2–8.

[46495] VGAM3324 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human parainfluenza virus 2. VGAM3324 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46496] VGAM3324 gene, herein designated VGAM GENE, encodes a VGAM3324 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3324 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3324 precursor RNA is designated SEQ ID:74733, and is provided hereinbelow with reference to the sequence listing part.

[46497] VGAM3324 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3324 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46498] An enzyme complex designated DICER COMPLEX, dices the VGAM3324 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3324 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3324 RNA is designated SEQ ID:74734, and is provided hereinbelow with reference to the sequence listing part.

[46499] VGAM3324 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3324 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3324 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46500] VGAM3324 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3324 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3324 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3324 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3324 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46501] The complementary binding of VGAM3324 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3324 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3324 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3324 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46502] It is appreciated that VGAM3324 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3324 host target genes. The mRNA of

each one of this plurality of VGAM3324 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3324 RNA, herein designated VGAM RNA, and which when bound by VGAM3324 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3324 host target proteins.

[46503] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3324 gene, herein designated VGAM GENE, on one or more VGAM3324 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[46504] It is yet further appreciated that a function of VGAM3324 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3324 include diagnosis, prevention and treatment of viral infection by Human parainfluenza virus 2. Specific functions, and accordingly utilities, of VGAM3324 correlate with, and may be deduced from, the identity of the host target genes which VGAM3324 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46505] Nucleotide sequences of the VGAM3324 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3324 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3324 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3324 are further described hereinbelow with reference to Table 1.

[46506] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3324 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[46507] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3325 (VGAM3325) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46508] VGAM3325 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3325 was detected is described hereinabove with reference to Figs. 2–8.

[46509] VGAM3325 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 6. VGAM3325 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46510] VGAM3325 gene, herein designated VGAM GENE, encodes a VGAM3325 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3325 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3325 precursor RNA is designated SEQ ID:74740, and is provided hereinbelow with reference to the sequence listing part.

[46511] VGAM3325 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3325 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46512] An enzyme complex designated DICER COMPLEX, dices the VGAM3325 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3325 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3325 RNA is designated SEQ ID:74741,

and is provided hereinbelow with reference to the sequence listing part.

[46513] VGAM3325 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3325 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3325 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46514] VGAM3325 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3325 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3325 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3325 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3325 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46515] The complementary binding of VGAM3325 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3325 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3325 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3325 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46516] It is appreciated that VGAM3325 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3325 host target genes. The mRNA of each one of this plurality of VGAM3325 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3325 RNA, herein designated VGAM RNA, and which when bound by VGAM3325 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3325 host target proteins.

[46517] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3325 gene, herein designated VGAM GENE, on one or more VGAM3325 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46518] It is yet further appreciated that a function of VGAM3325 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3325 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 6. Specific functions, and accordingly utilities, of VGAM3325 correlate with, and may be deduced from, the identity of the host target genes which VGAM3325 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46519] Nucleotide sequences of the VGAM3325 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3325 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3325 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3325 are further described hereinbelow with reference to Table 1.

[46520] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3325 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46521] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3326 (VGAM3326) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46522] VGAM3326 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3326 was detected is described hereinabove with reference to Figs. 2–8.

[46523] VGAM3326 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 6. VGAM3326 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46524] VGAM3326 gene, herein designated VGAM GENE, encodes a VGAM3326 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3326 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3326 precu-

sor RNA is designated SEQ ID:74764, and is provided hereinbelow with reference to the sequence listing part.

[46525] VGAM3326 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3326 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46526] An enzyme complex designated DICER COMPLEX, dices the VGAM3326 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3326 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3326 RNA is designated SEQ ID:74765, and is provided hereinbelow with reference to the se-

quence listing part.

[46527] VGAM3326 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3326 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3326 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46528] VGAM3326 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3326 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3326 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3326 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3326 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46529] The complementary binding of VGAM3326 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3326 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3326 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3326 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46530] It is appreciated that VGAM3326 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3326 host target genes. The mRNA of each one of this plurality of VGAM3326 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3326 RNA, herein designated VGAM RNA, and which when bound by VGAM3326 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3326 host target proteins.

[46531] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3326 gene, herein designated VGAM GENE, on one or more VGAM3326 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46532] It is yet further appreciated that a function of VGAM3326

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3326 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 6. Specific functions, and accordingly utilities, of VGAM3326 correlate with, and may be deduced from, the identity of the host target genes which VGAM3326 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46533] Nucleotide sequences of the VGAM3326 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3326 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3326 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3326 are further described hereinbelow with reference to Table 1.

[46534] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3326 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46535] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3327 (VGAM3327) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46536] VGAM3327 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3327 was detected is described hereinabove with reference to Figs. 2–8.

[46537] VGAM3327 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cocksfoot streak virus. VGAM3327 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46538] VGAM3327 gene, herein designated VGAM GENE, encodes a VGAM3327 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3327 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3327 precursor RNA is designated SEQ ID:74768, and is provided

hereinbelow with reference to the sequence listing part.

[46539] VGAM3327 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3327 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46540] An enzyme complex designated DICER COMPLEX, dices the VGAM3327 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3327 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3327 RNA is designated SEQ ID:74769, and is provided hereinbelow with reference to the sequence listing part.

[46541] VGAM3327 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3327 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3327 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46542] VGAM3327 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3327 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3327 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3327 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3327 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46543] The complementary binding of VGAM3327 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3327 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3327 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3327 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46544] It is appreciated that VGAM3327 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3327 host target genes. The mRNA of each one of this plurality of VGAM3327 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3327 RNA, herein designated VGAM RNA, and which when bound by VGAM3327 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3327 host target proteins.

[46545] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3327 gene, herein designated VGAM GENE, on one or more VGAM3327 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46546] It is yet further appreciated that a function of VGAM3327 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3327 include diagnosis, prevention and treatment of viral infection by Cocksfoot streak virus.

Specific functions, and accordingly utilities, of VGAM3327 correlate with, and may be deduced from, the identity of the host target genes which VGAM3327 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46547] Nucleotide sequences of the VGAM3327 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3327 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3327 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3327 are further described hereinbelow with reference to Table 1.

[46548] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3327 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46549] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3328 (VGAM3328) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46550] VGAM3328 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3328 was detected is described hereinabove with reference to Figs. 2–8.

[46551] VGAM3328 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Canine oral papillomavirus. VGAM3328 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46552] VGAM3328 gene, herein designated VGAM GENE, encodes a VGAM3328 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3328 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3328 precursor RNA is designated SEQ ID:74779, and is provided hereinbelow with reference to the sequence listing part.

[46553] VGAM3328 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3328 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46554] An enzyme complex designated DICER COMPLEX, dices the VGAM3328 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3328 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3328 RNA is designated SEQ ID:74780, and is provided hereinbelow with reference to the sequence listing part.

[46555] VGAM3328 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3328 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3328 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46556] VGAM3328 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3328 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3328 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3328 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3328 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46557] The complementary binding of VGAM3328 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3328 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3328 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3328 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46558] It is appreciated that VGAM3328 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3328 host target genes. The mRNA of each one of this plurality of VGAM3328 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3328 RNA, herein designated VGAM

RNA, and which when bound by VGAM3328 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3328 host target proteins.

[46559] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3328 gene, herein designated VGAM GENE, on one or more VGAM3328 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46560] It is yet further appreciated that a function of VGAM3328 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3328 include diagnosis, prevention and treatment of viral infection by Canine oral papillomavirus. Specific functions, and accordingly utilities, of VGAM3328 correlate with, and may be deduced from, the identity of the host target genes which VGAM3328 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46561] Nucleotide sequences of the VGAM3328 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3328 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3328 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3328 are further described hereinbelow with reference to Table 1.

[46562] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3328 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46563] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3329 (VGAM3329) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46564] VGAM3329 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3329 was detected is described hereinabove with reference to Figs. 2-8.

[46565] VGAM3329 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Swinepox virus. VGAM3329 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46566] VGAM3329 gene, herein designated VGAM GENE, encodes a VGAM3329 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3329 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3329 precursor RNA is designated SEQ ID:74799, and is provided hereinbelow with reference to the sequence listing part.

[46567] VGAM3329 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3329 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46568] An enzyme complex designated DICER COMPLEX, dices the VGAM3329 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3329 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3329 RNA is designated SEQ ID:74800, and is provided hereinbelow with reference to the sequence listing part.

[46569] VGAM3329 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3329 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3329 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46570] VGAM3329 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3329 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3329 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3329 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3329 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46571] The complementary binding of VGAM3329 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3329 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3329 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3329 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46572] It is appreciated that VGAM3329 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3329 host target genes. The mRNA of each one of this plurality of VGAM3329 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3329 RNA, herein designated VGAM RNA, and which when bound by VGAM3329 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3329 host target proteins.

[46573] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3329 gene, herein designated VGAM GENE, on one or more VGAM3329 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46574] It is yet further appreciated that a function of VGAM3329 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3329 include diagnosis, prevention and

treatment of viral infection by Swinepox virus. Specific functions, and accordingly utilities, of VGAM3329 correlate with, and may be deduced from, the identity of the host target genes which VGAM3329 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46575] Nucleotide sequences of the VGAM3329 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3329 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3329 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3329 are further described hereinbelow with reference to Table 1.

[46576] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3329 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46577] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3330 (VGAM3330) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46578] VGAM3330 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3330 was detected is described hereinabove with reference to Figs. 2–8.

[46579] VGAM3330 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 8. VGAM3330 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46580] VGAM3330 gene, herein designated VGAM GENE, encodes a VGAM3330 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3330 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3330 precursor RNA is designated SEQ ID:74805, and is provided hereinbelow with reference to the sequence listing part.

[46581] VGAM3330 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3330 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46582] An enzyme complex designated DICER COMPLEX, dices the VGAM3330 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3330 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3330 RNA is designated SEQ ID:74806, and is provided hereinbelow with reference to the sequence listing part.

[46583] VGAM3330 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3330 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3330 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46584] VGAM3330 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3330 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3330 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3330 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3330 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46585] The complementary binding of VGAM3330 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3330 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3330 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3330 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46586] It is appreciated that VGAM3330 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3330 host target genes. The mRNA of each one of this plurality of VGAM3330 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3330 RNA, herein designated VGAM RNA, and which when bound by VGAM3330 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3330 host target proteins.

[46587] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3330 gene, herein designated VGAM GENE, on one or more VGAM3330 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46588] It is yet further appreciated that a function of VGAM3330 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3330 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 8. Spe-

cific functions, and accordingly utilities, of VGAM3330 correlate with, and may be deduced from, the identity of the host target genes which VGAM3330 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46589] Nucleotide sequences of the VGAM3330 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3330 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3330 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3330 are further described hereinbelow with reference to Table 1.

[46590] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3330 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46591] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3331 (VGAM3331) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[46592] VGAM3331 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3331 was detected is described hereinabove with reference to Figs. 2–8.

[46593] VGAM3331 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 8. VGAM3331 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46594] VGAM3331 gene, herein designated VGAM GENE, encodes a VGAM3331 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3331 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3331 precursor RNA is designated SEQ ID:74817, and is provided hereinbelow with reference to the sequence listing part.

[46595] VGAM3331 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3331 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46596] An enzyme complex designated DICER COMPLEX, dices the VGAM3331 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3331 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3331 RNA is designated SEQ ID:74818, and is provided hereinbelow with reference to the sequence listing part.

[46597] VGAM3331 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3331 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3331 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46598] VGAM3331 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3331 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3331 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3331 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3331 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46599] The complementary binding of VGAM3331 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3331 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3331 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3331 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46600] It is appreciated that VGAM3331 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3331 host target genes. The mRNA of each one of this plurality of VGAM3331 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3331 RNA, herein designated VGAM RNA, and which when bound by VGAM3331 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3331 host target proteins.

[46601] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3331 gene, herein designated VGAM GENE, on one or more VGAM3331 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46602] It is yet further appreciated that a function of VGAM3331 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3331 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 8. Specific functions, and accordingly utilities, of VGAM3331

correlate with, and may be deduced from, the identity of the host target genes which VGAM3331 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46603] Nucleotide sequences of the VGAM3331 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3331 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3331 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3331 are further described hereinbelow with reference to Table 1.

[46604] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3331 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46605] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3332 (VGAM3332) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[46606] VGAM3332 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3332 was detected is described hereinabove with reference to Figs. 2–8.

[46607] VGAM3332 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3332 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46608] VGAM3332 gene, herein designated VGAM GENE, encodes a VGAM3332 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3332 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3332 precursor RNA is designated SEQ ID:74900, and is provided hereinbelow with reference to the sequence listing part.

[46609] VGAM3332 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3332 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46610] An enzyme complex designated DICER COMPLEX, dices the VGAM3332 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3332 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3332 RNA is designated SEQ ID:74901, and is provided hereinbelow with reference to the sequence listing part.

[46611] VGAM3332 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3332 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3332 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46612] VGAM3332 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3332 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3332 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3332 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3332 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46613] The complementary binding of VGAM3332 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3332 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3332 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3332 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46614] It is appreciated that VGAM3332 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3332 host target genes. The mRNA of each one of this plurality of VGAM3332 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3332 RNA, herein designated VGAM RNA, and which when bound by VGAM3332 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3332 host target proteins.

[46615] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3332 gene, herein designated VGAM GENE, on one or more VGAM3332 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46616] It is yet further appreciated that a function of VGAM3332 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3332 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3332 correlate with, and may be deduced from, the identity of the

host target genes which VGAM3332 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46617] Nucleotide sequences of the VGAM3332 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3332 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3332 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3332 are further described hereinbelow with reference to Table 1.

[46618] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3332 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46619] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3333 (VGAM3333) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46620] VGAM3333 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3333 was detected is described hereinabove with reference to Figs. 2–8.

[46621] VGAM3333 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Soybean mosaic virus. VGAM3333 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46622] VGAM3333 gene, herein designated VGAM GENE, encodes a VGAM3333 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3333 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3333 precursor RNA is designated SEQ ID:74933, and is provided hereinbelow with reference to the sequence listing part.

[46623] VGAM3333 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3333 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46624] An enzyme complex designated DICER COMPLEX, dices the VGAM3333 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3333 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3333 RNA is designated SEQ ID:74934, and is provided hereinbelow with reference to the sequence listing part.

[46625] VGAM3333 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3333 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3333 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46626] VGAM3333 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3333 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3333 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3333 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3333 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46627] The complementary binding of VGAM3333 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3333 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3333 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3333 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46628] It is appreciated that VGAM3333 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3333 host target genes. The mRNA of each one of this plurality of VGAM3333 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3333 RNA, herein designated VGAM RNA, and which when bound by VGAM3333 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3333 host target proteins.

[46629] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3333 gene, herein designated VGAM GENE, on one or more VGAM3333 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46630] It is yet further appreciated that a function of VGAM3333 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3333 include diagnosis, prevention and treatment of viral infection by Soybean mosaic virus. Specific functions, and accordingly utilities, of VGAM3333 correlate with, and may be deduced from, the identity of the host target genes which VGAM3333 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[46631] Nucleotide sequences of the VGAM3333 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3333 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3333 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3333 are further described hereinbelow with reference to Table 1.

[46632] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3333 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46633] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3334 (VGAM3334) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46634] VGAM3334 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3334 was detected is described hereinabove with reference to Figs. 2–8.

[46635] VGAM3334 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tobacco rattle virus. VGAM3334 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46636] VGAM3334 gene, herein designated VGAM GENE, encodes a VGAM3334 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3334 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3334 precursor RNA is designated SEQ ID:74942, and is provided hereinbelow with reference to the sequence listing part.

[46637] VGAM3334 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3334 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46638] An enzyme complex designated DICER COMPLEX, dices the VGAM3334 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3334 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3334 RNA is designated SEQ ID:74943, and is provided hereinbelow with reference to the sequence listing part.

[46639] VGAM3334 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3334 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3334 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46640] VGAM3334 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3334 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3334 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3334 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3334 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[46641] The complementary binding of VGAM3334 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3334 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3334 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3334 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46642] It is appreciated that VGAM3334 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3334 host target genes. The mRNA of each one of this plurality of VGAM3334 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3334 RNA, herein designated VGAM RNA, and which when bound by VGAM3334 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3334 host target proteins.

[46643] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3334 gene, herein designated VGAM GENE, on one or more VGAM3334 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46644] It is yet further appreciated that a function of VGAM3334 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3334 include diagnosis, prevention and treatment of viral infection by Tobacco rattle virus. Specific functions, and accordingly utilities, of VGAM3334 correlate with, and may be deduced from, the identity of the host target genes which VGAM3334 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[46645] Nucleotide sequences of the VGAM3334 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3334 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3334 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3334 are further described hereinbelow with reference to Table 1.

[46646] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3334 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46647] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3335 (VGAM3335) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46648] VGAM3335 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3335 was detected is described hereinabove with reference to Figs. 2–8.

[46649] VGAM3335 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tobacco rattle virus.

VGAM3335 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46650] VGAM3335 gene, herein designated VGAM GENE, encodes a VGAM3335 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3335 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3335 precursor RNA is designated SEQ ID:74947, and is provided hereinbelow with reference to the sequence listing part.

[46651] VGAM3335 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3335 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46652] An enzyme complex designated DICER COMPLEX, dices the VGAM3335 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3335 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3335 RNA is designated SEQ ID:74948, and is provided hereinbelow with reference to the sequence listing part.

[46653] VGAM3335 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3335 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3335 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[46654] VGAM3335 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3335 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3335 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3335 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3335 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46655] The complementary binding of VGAM3335 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3335 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3335 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3335 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46656] It is appreciated that VGAM3335 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3335 host target genes. The mRNA of each one of this plurality of VGAM3335 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3335 RNA, herein designated VGAM RNA, and which when bound by VGAM3335 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3335 host target proteins.

[46657] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3335 gene, herein designated VGAM GENE, on one

or more VGAM3335 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46658] It is yet further appreciated that a function of VGAM3335 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3335 include diagnosis, prevention and treatment of viral infection by Tobacco rattle virus. Specific functions, and accordingly utilities, of VGAM3335 correlate with, and may be deduced from, the identity of the host target genes which VGAM3335 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46659] Nucleotide sequences of the VGAM3335 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3335 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3335 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3335 are further described hereinbelow with reference to Table 1.

[46660] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3335 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46661] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3336 (VGAM3336) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46662] VGAM3336 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3336 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[46663] VGAM3336 gene, herein designated VGAM GENE, is a viral gene contained in the genome of *Melanoplus sanguinipes* entomopoxvirus. VGAM3336 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46664] VGAM3336 gene, herein designated VGAM GENE, encodes a VGAM3336 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3336 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3336 precursor RNA is designated SEQ ID:74960, and is provided hereinbelow with reference to the sequence listing part.

[46665] VGAM3336 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3336 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46666] An enzyme complex designated DICER COMPLEX, dices the VGAM3336 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3336 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3336 RNA is designated SEQ ID:74961, and is provided hereinbelow with reference to the sequence listing part.

[46667] VGAM3336 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3336 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3336 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46668] VGAM3336 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3336 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3336 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3336 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3336 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46669] The complementary binding of VGAM3336 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3336 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3336 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3336 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46670] It is appreciated that VGAM3336 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3336 host target genes. The mRNA of each one of this plurality of VGAM3336 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3336 RNA, herein designated VGAM RNA, and which when bound by VGAM3336 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3336 host target proteins.

[46671] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3336 gene, herein designated VGAM GENE, on one or more VGAM3336 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46672] It is yet further appreciated that a function of VGAM3336 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3336 include diagnosis, prevention and treatment of viral infection by Melanoplus sanguinipes entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3336 correlate with, and may be deduced from, the identity of the host target genes which VGAM3336 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46673] Nucleotide sequences of the VGAM3336 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3336 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3336 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3336 are further described hereinbelow with reference to Table 1.

[46674] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3336 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46675] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3337 (VGAM3337) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46676] VGAM3337 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3337 was detected is described hereinabove with reference to Figs. 2-8.

[46677] VGAM3337 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Avian paramyxovirus 6. VGAM3337 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46678] VGAM3337 gene, herein designated VGAM GENE, encodes a VGAM3337 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3337 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3337 precursor RNA is designated SEQ ID:74963, and is provided hereinbelow with reference to the sequence listing part.

[46679] VGAM3337 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3337 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[46680] An enzyme complex designated DICER COMPLEX, dices the VGAM3337 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3337 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3337 RNA is designated SEQ ID:74964, and is provided hereinbelow with reference to the sequence listing part.

[46681] VGAM3337 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3337 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3337 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46682] VGAM3337 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3337 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3337 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3337 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3337 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46683] The complementary binding of VGAM3337 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3337 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3337 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3337 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46684] It is appreciated that VGAM3337 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3337 host target genes. The mRNA of each one of this plurality of VGAM3337 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3337 RNA, herein designated VGAM RNA, and which when bound by VGAM3337 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3337 host target proteins.

[46685] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3337 gene, herein designated VGAM GENE, on one or more VGAM3337 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46686] It is yet further appreciated that a function of VGAM3337 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3337 include diagnosis, prevention and treatment of viral infection by Avian paramyxovirus 6. Specific functions, and accordingly utilities, of VGAM3337 correlate with, and may be deduced from, the identity of the host target genes which VGAM3337 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46687] Nucleotide sequences of the VGAM3337 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3337 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3337 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3337 are further described hereinbelow with reference to Table 1.

[46688] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3337 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46689] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3338 (VGAM3338) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46690] VGAM3338 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3338 was detected is described hereinabove with reference to Figs. 2-8.

[46691] VGAM3338 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Avian paramyxovirus 6. VGAM3338 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46692] VGAM3338 gene, herein designated VGAM GENE, encodes a VGAM3338 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3338 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3338 precursor RNA is designated SEQ ID:75002, and is provided hereinbelow with reference to the sequence listing part.

[46693] VGAM3338 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3338 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46694] An enzyme complex designated DICER COMPLEX, dices the VGAM3338 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3338 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3338 RNA is designated SEQ ID:75003, and is provided hereinbelow with reference to the sequence listing part.

[46695] VGAM3338 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3338 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3338 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46696] VGAM3338 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3338 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3338 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3338 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3338 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46697] The complementary binding of VGAM3338 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3338 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3338 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3338 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46698] It is appreciated that VGAM3338 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3338 host target genes. The mRNA of each one of this plurality of VGAM3338 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3338 RNA, herein designated VGAM RNA, and which when bound by VGAM3338 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3338 host target proteins.

[46699] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3338 gene, herein designated VGAM GENE, on one or more VGAM3338 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46700] It is yet further appreciated that a function of VGAM3338 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3338 include diagnosis, prevention and treatment of viral infection by Avian paramyxovirus 6. Specific functions, and accordingly utilities, of VGAM3338 correlate with, and may be deduced from, the identity of the host target genes which VGAM3338 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46701] Nucleotide sequences of the VGAM3338 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3338 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3338 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3338 are further described hereinbelow with reference to Table 1.

[46702] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3338 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46703] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3339 (VGAM3339) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46704] VGAM3339 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3339 was detected is described hereinabove with reference to Figs. 2-8.

[46705] VGAM3339 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cy-

tomegalovirus. VGAM3339 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46706] VGAM3339 gene, herein designated VGAM GENE, encodes a VGAM3339 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3339 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3339 precursor RNA is designated SEQ ID:75014, and is provided hereinbelow with reference to the sequence listing part.

[46707] VGAM3339 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3339 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46708] An enzyme complex designated DICER COMPLEX, dices

the VGAM3339 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3339 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3339 RNA is designated SEQ ID:75015, and is provided hereinbelow with reference to the sequence listing part.

[46709] VGAM3339 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3339 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3339 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46710] VGAM3339 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3339 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3339 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3339 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3339 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46711] The complementary binding of VGAM3339 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3339 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3339 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3339 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46712] It is appreciated that VGAM3339 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3339 host target genes. The mRNA of each one of this plurality of VGAM3339 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3339 RNA, herein designated VGAM RNA, and which when bound by VGAM3339 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3339 host target proteins.

[46713] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3339 gene, herein designated VGAM GENE, on one or more VGAM3339 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46714] It is yet further appreciated that a function of VGAM3339 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3339 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3339 correlate with, and may be deduced from, the identity of the host target genes which VGAM3339 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46715] Nucleotide sequences of the VGAM3339 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3339 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3339 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3339 are further described hereinbelow with reference to Table 1.

[46716] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3339 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46717] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3340 (VGAM3340) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46718] VGAM3340 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3340 was detected is described hereinabove with reference to Figs. 2-8.

[46719] VGAM3340 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpea severe mosaic virus. VGAM3340 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46720] VGAM3340 gene, herein designated VGAM GENE, encodes a VGAM3340 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3340 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3340 precursor RNA is designated SEQ ID:75024, and is provided hereinbelow with reference to the sequence listing part.

[46721] VGAM3340 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3340 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46722] An enzyme complex designated DICER COMPLEX, dices the VGAM3340 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3340 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3340 RNA is designated SEQ ID:75025, and is provided hereinbelow with reference to the sequence listing part.

[46723] VGAM3340 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3340 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3340 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46724] VGAM3340 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3340 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3340 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3340 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3340 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46725] The complementary binding of VGAM3340 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3340 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3340

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3340 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46726] It is appreciated that VGAM3340 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3340 host target genes. The mRNA of each one of this plurality of VGAM3340 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3340 RNA, herein designated VGAM RNA, and which when bound by VGAM3340 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3340 host target proteins.

[46727] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3340 gene, herein designated VGAM GENE, on one or more VGAM3340 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46728] It is yet further appreciated that a function of VGAM3340 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3340 include diagnosis, prevention and treatment of viral infection by Cowpea severe mosaic virus. Specific functions, and accordingly utilities, of VGAM3340 correlate with, and may be deduced from, the identity of the host target genes which VGAM3340 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46729] Nucleotide sequences of the VGAM3340 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3340 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3340 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3340 are further described hereinbelow with reference to Table 1.

[46730] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3340 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46731] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3341 (VGAM3341) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46732] VGAM3341 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3341 was detected is described hereinabove with reference to Figs. 2-8.

[46733] VGAM3341 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious spleen and kidney necrosis virus. VGAM3341 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene

contained in the human genome.

[46734] VGAM3341 gene, herein designated VGAM GENE, encodes a VGAM3341 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3341 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3341 precursor RNA is designated SEQ ID:75074, and is provided hereinbelow with reference to the sequence listing part.

[46735] VGAM3341 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3341 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46736] An enzyme complex designated DICER COMPLEX, dices the VGAM3341 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3341 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3341 RNA is designated SEQ ID:75075, and is provided hereinbelow with reference to the sequence listing part.

[46737] VGAM3341 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3341 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3341 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46738] VGAM3341 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3341 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3341 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3341 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3341 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46739] The complementary binding of VGAM3341 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3341 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3341 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3341 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46740] It is appreciated that VGAM3341 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3341 host target genes. The mRNA of each one of this plurality of VGAM3341 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3341 RNA, herein designated VGAM RNA, and which when bound by VGAM3341 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3341 host target proteins.

[46741] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3341 gene, herein designated VGAM GENE, on one or more VGAM3341 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46742] It is yet further appreciated that a function of VGAM3341 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3341 include diagnosis, prevention and treatment of viral infection by Infectious spleen and kidney necrosis virus. Specific functions, and accordingly utilities, of VGAM3341 correlate with, and may be deduced from, the identity of the host target genes which VGAM3341 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46743] Nucleotide sequences of the VGAM3341 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3341 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3341 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3341 are further

described hereinbelow with reference to Table 1.

[46744] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3341 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46745] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3342 (VGAM3342) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46746] VGAM3342 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3342 was detected is described hereinabove with reference to Figs. 2-8.

[46747] VGAM3342 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 48. VGAM3342 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46748] VGAM3342 gene, herein designated VGAM GENE, encodes a VGAM3342 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3342 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3342 precursor RNA is designated SEQ ID:75210, and is provided hereinbelow with reference to the sequence listing part.

[46749] VGAM3342 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3342 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46750] An enzyme complex designated DICER COMPLEX, dices the VGAM3342 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3342 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3342 RNA is designated SEQ ID:75211, and is provided hereinbelow with reference to the sequence listing part.

[46751] VGAM3342 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3342 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3342 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46752] VGAM3342 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3342 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3342 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3342 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3342 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46753] The complementary binding of VGAM3342 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3342 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3342 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3342 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46754] It is appreciated that VGAM3342 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3342 host target genes. The mRNA of each one of this plurality of VGAM3342 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3342 RNA, herein designated VGAM RNA, and which when bound by VGAM3342 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3342 host target proteins.

[46755] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3342 gene, herein designated VGAM GENE, on one or more VGAM3342 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46756] It is yet further appreciated that a function of VGAM3342 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3342 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 48. Specific functions, and accordingly utilities, of VGAM3342 correlate with, and may be deduced from, the identity of the host target genes which VGAM3342 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46757] Nucleotide sequences of the VGAM3342 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3342 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3342 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3342 are further described hereinbelow with reference to Table 1.

[46758] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3342 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46759] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3343 (VGAM3343) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46760] VGAM3343 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3343 was detected is described hereinabove with reference to Figs. 2-8.

[46761] VGAM3343 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Murine hepatitis virus. VGAM3343 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46762] VGAM3343 gene, herein designated VGAM GENE, encodes

a VGAM3343 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3343 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3343 precursor RNA is designated SEQ ID:75233, and is provided hereinbelow with reference to the sequence listing part.

[46763] VGAM3343 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3343 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46764] An enzyme complex designated DICER COMPLEX, dices the VGAM3343 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3343 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3343 RNA is designated SEQ ID:75234, and is provided hereinbelow with reference to the sequence listing part.

[46765] VGAM3343 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3343 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3343 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46766] VGAM3343 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3343 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3343 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3343 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3343 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46767] The complementary binding of VGAM3343 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3343 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3343 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3343 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[46768] It is appreciated that VGAM3343 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3343 host target genes. The mRNA of each one of this plurality of VGAM3343 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3343 RNA, herein designated VGAM RNA, and which when bound by VGAM3343 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3343 host target proteins.

[46769] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3343 gene, herein designated VGAM GENE, on one or more VGAM3343 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46770] It is yet further appreciated that a function of VGAM3343 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3343 include diagnosis, prevention and treatment of viral infection by Murine hepatitis virus. Specific functions, and accordingly utilities, of VGAM3343 correlate with, and may be deduced from, the identity of the host target genes which VGAM3343 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46771] Nucleotide sequences of the VGAM3343 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3343 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3343 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3343 are further described hereinbelow with reference to Table 1.

[46772] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3343 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46773] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3344 (VGAM3344) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46774] VGAM3344 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3344 was detected is described hereinabove with reference to Figs. 2-8.

[46775] VGAM3344 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Yaba-like disease virus. VGAM3344 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46776] VGAM3344 gene, herein designated VGAM GENE, encodes a VGAM3344 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3344 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3344 precursor RNA is designated SEQ ID:75248, and is provided hereinbelow with reference to the sequence listing part.

[46777] VGAM3344 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3344 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46778] An enzyme complex designated DICER COMPLEX, dices the VGAM3344 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3344 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3344 RNA is designated SEQ ID:75249, and is provided hereinbelow with reference to the sequence listing part.

[46779] VGAM3344 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3344 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3344 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46780] VGAM3344 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3344 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3344 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3344 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3344 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46781] The complementary binding of VGAM3344 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3344 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3344 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3344 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46782] It is appreciated that VGAM3344 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3344 host target genes. The mRNA of each one of this plurality of VGAM3344 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3344 RNA, herein designated VGAM RNA, and which when bound by VGAM3344 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3344 host target proteins.

[46783] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3344 gene, herein designated VGAM GENE, on one or more VGAM3344 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46784] It is yet further appreciated that a function of VGAM3344 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3344 include diagnosis, prevention and treatment of viral infection by Yaba-like disease virus. Specific functions, and accordingly utilities, of VGAM3344 correlate with, and may be deduced from, the identity of the host target genes which VGAM3344 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46785] Nucleotide sequences of the VGAM3344 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3344 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3344 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3344 are further described hereinbelow with reference to Table 1.

[46786] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3344 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46787] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3345 (VGAM3345) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46788] VGAM3345 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3345 was detected is described hereinabove with reference to Figs. 2-8.

[46789] VGAM3345 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 60. VGAM3345 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46790] VGAM3345 gene, herein designated VGAM GENE, encodes a VGAM3345 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3345 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3345 precursor RNA is designated SEQ ID:75258, and is provided hereinbelow with reference to the sequence listing part.

[46791] VGAM3345 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3345 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46792] An enzyme complex designated DICER COMPLEX, dices the VGAM3345 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3345 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3345 RNA is designated SEQ ID:75259, and is provided hereinbelow with reference to the sequence listing part.

[46793] VGAM3345 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3345 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3345 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46794] VGAM3345 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3345 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3345 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3345 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3345 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46795] The complementary binding of VGAM3345 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3345 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3345 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3345 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46796] It is appreciated that VGAM3345 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3345 host target genes. The mRNA of each one of this plurality of VGAM3345 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3345 RNA, herein designated VGAM RNA, and which when bound by VGAM3345 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3345 host target proteins.

[46797] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3345 gene, herein designated VGAM GENE, on one or more VGAM3345 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46798] It is yet further appreciated that a function of VGAM3345 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3345 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 60. Specific functions, and accordingly utilities, of VGAM3345 correlate with, and may be deduced from, the identity of the host target genes which VGAM3345 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46799] Nucleotide sequences of the VGAM3345 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3345 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3345 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3345 are further described hereinbelow with reference to Table 1.

[46800] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3345 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46801] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3346 (VGAM3346) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46802] VGAM3346 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3346 was detected is described hereinabove with reference to Figs. 2–8.

[46803] VGAM3346 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 60. VGAM3346 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46804] VGAM3346 gene, herein designated VGAM GENE, encodes a VGAM3346 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3346 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3346 precursor RNA is designated SEQ ID:75273, and is provided hereinbelow with reference to the sequence listing part.

[46805] VGAM3346 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3346 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46806] An enzyme complex designated DICER COMPLEX, dices the VGAM3346 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3346 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3346 RNA is designated SEQ ID:75274, and is provided hereinbelow with reference to the sequence listing part.

[46807] VGAM3346 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3346 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3346 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46808] VGAM3346 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3346 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3346 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3346 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3346 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46809] The complementary binding of VGAM3346 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3346 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3346 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3346 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46810] It is appreciated that VGAM3346 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3346 host target genes. The mRNA of each one of this plurality of VGAM3346 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3346 RNA, herein designated VGAM RNA, and which when bound by VGAM3346 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3346 host target proteins.

[46811] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3346 gene, herein designated VGAM GENE, on one or more VGAM3346 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[46812] It is yet further appreciated that a function of VGAM3346 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3346 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 60. Specific functions, and accordingly utilities, of VGAM3346 correlate with, and may be deduced from, the identity of the host target genes which VGAM3346 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46813] Nucleotide sequences of the VGAM3346 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3346 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3346 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3346 are further described hereinbelow with reference to Table 1.

[46814] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3346 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46815] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3347 (VGAM3347) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46816] VGAM3347 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3347 was detected is described hereinabove with reference to Figs. 2-8.

[46817] VGAM3347 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3347 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46818] VGAM3347 gene, herein designated VGAM GENE, encodes a VGAM3347 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3347 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3347 precursor RNA is designated SEQ ID:75286, and is provided hereinbelow with reference to the sequence listing part.

[46819] VGAM3347 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3347 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46820] An enzyme complex designated DICER COMPLEX, dices the VGAM3347 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3347 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3347 RNA is designated SEQ ID:75287, and is provided hereinbelow with reference to the sequence listing part.

[46821] VGAM3347 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3347 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3347 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46822] VGAM3347 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3347 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3347 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3347 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3347 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46823] The complementary binding of VGAM3347 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3347 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3347 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3347 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46824] It is appreciated that VGAM3347 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3347 host target genes. The mRNA of

each one of this plurality of VGAM3347 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3347 RNA, herein designated VGAM RNA, and which when bound by VGAM3347 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3347 host target proteins.

[46825] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3347 gene, herein designated VGAM GENE, on one or more VGAM3347 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[46826] It is yet further appreciated that a function of VGAM3347 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3347 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3347 correlate with, and may be deduced from, the identity of the host target genes which VGAM3347 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46827] Nucleotide sequences of the VGAM3347 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3347 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3347 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3347 are further described hereinbelow with reference to Table 1.

[46828] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3347 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[46829] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3348 (VGAM3348) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46830] VGAM3348 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3348 was detected is described hereinabove with reference to Figs. 2–8.

[46831] VGAM3348 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpea mottle virus. VGAM3348 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46832] VGAM3348 gene, herein designated VGAM GENE, encodes a VGAM3348 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3348 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3348 precursor RNA is designated SEQ ID:75309, and is provided hereinbelow with reference to the sequence listing part.

[46833] VGAM3348 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3348 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46834] An enzyme complex designated DICER COMPLEX, dices the VGAM3348 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3348 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3348 RNA is designated SEQ ID:75310,

and is provided hereinbelow with reference to the sequence listing part.

[46835] VGAM3348 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3348 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3348 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46836] VGAM3348 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3348 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3348 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3348 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3348 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46837] The complementary binding of VGAM3348 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3348 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3348 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3348 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46838] It is appreciated that VGAM3348 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3348 host target genes. The mRNA of each one of this plurality of VGAM3348 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3348 RNA, herein designated VGAM RNA, and which when bound by VGAM3348 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3348 host target proteins.

[46839] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3348 gene, herein designated VGAM GENE, on one or more VGAM3348 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46840] It is yet further appreciated that a function of VGAM3348 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3348 include diagnosis, prevention and treatment of viral infection by Cowpea mottle virus. Specific functions, and accordingly utilities, of VGAM3348 correlate with, and may be deduced from, the identity of the host target genes which VGAM3348 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46841] Nucleotide sequences of the VGAM3348 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3348 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3348 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3348 are further described hereinbelow with reference to Table 1.

[46842] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3348 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46843] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3349 (VGAM3349) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46844] VGAM3349 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3349 was detected is described hereinabove with reference to Figs. 2–8.

[46845] VGAM3349 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus. VGAM3349 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46846] VGAM3349 gene, herein designated VGAM GENE, encodes a VGAM3349 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3349 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3349 precu-

sor RNA is designated SEQ ID:75326, and is provided hereinbelow with reference to the sequence listing part.

[46847] VGAM3349 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3349 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46848] An enzyme complex designated DICER COMPLEX, dices the VGAM3349 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3349 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3349 RNA is designated SEQ ID:75327, and is provided hereinbelow with reference to the se-

quence listing part.

[46849] VGAM3349 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3349 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3349 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46850] VGAM3349 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3349 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3349 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3349 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3349 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46851] The complementary binding of VGAM3349 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3349 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3349 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3349 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46852] It is appreciated that VGAM3349 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3349 host target genes. The mRNA of each one of this plurality of VGAM3349 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3349 RNA, herein designated VGAM RNA, and which when bound by VGAM3349 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3349 host target proteins.

[46853] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3349 gene, herein designated VGAM GENE, on one or more VGAM3349 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46854] It is yet further appreciated that a function of VGAM3349

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3349 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3349 correlate with, and may be deduced from, the identity of the host target genes which VGAM3349 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46855] Nucleotide sequences of the VGAM3349 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3349 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3349 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3349 are further described hereinbelow with reference to Table 1.

[46856] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3349 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46857] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3350 (VGAM3350) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46858] VGAM3350 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3350 was detected is described hereinabove with reference to Figs. 2–8.

[46859] VGAM3350 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sonchus yellow net virus. VGAM3350 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46860] VGAM3350 gene, herein designated VGAM GENE, encodes a VGAM3350 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3350 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3350 precursor RNA is designated SEQ ID:75371, and is provided

hereinbelow with reference to the sequence listing part.

[46861] VGAM3350 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3350 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46862] An enzyme complex designated DICER COMPLEX, dices the VGAM3350 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3350 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3350 RNA is designated SEQ ID:75372, and is provided hereinbelow with reference to the sequence listing part.

[46863] VGAM3350 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3350 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3350 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46864] VGAM3350 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3350 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3350 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3350 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3350 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46865] The complementary binding of VGAM3350 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3350 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3350 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3350 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46866] It is appreciated that VGAM3350 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3350 host target genes. The mRNA of each one of this plurality of VGAM3350 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3350 RNA, herein designated VGAM RNA, and which when bound by VGAM3350 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3350 host target proteins.

[46867] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3350 gene, herein designated VGAM GENE, on one or more VGAM3350 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46868] It is yet further appreciated that a function of VGAM3350 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3350 include diagnosis, prevention and treatment of viral infection by Sonchus yellow net virus. Specific functions, and accordingly utilities, of VGAM3350 correlate with, and may be deduced from, the identity of the host target genes which VGAM3350 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46869] Nucleotide sequences of the VGAM3350 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3350 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3350 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3350 are further described hereinbelow with reference to Table 1.

[46870] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3350 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46871] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3351 (VGAM3351) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46872] VGAM3351 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3351 was detected is described hereinabove with reference to Figs. 2–8.

[46873] VGAM3351 gene, herein designated VGAM GENE, is a viral gene contained in the genome of White clover mosaic virus. VGAM3351 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46874] VGAM3351 gene, herein designated VGAM GENE, encodes a VGAM3351 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3351 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3351 precursor RNA is designated SEQ ID:75374, and is provided hereinbelow with reference to the sequence listing part.

[46875] VGAM3351 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3351 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46876] An enzyme complex designated DICER COMPLEX, dices the VGAM3351 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3351 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3351 RNA is designated SEQ ID:75375, and is provided hereinbelow with reference to the sequence listing part.

[46877] VGAM3351 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3351 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3351 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46878] VGAM3351 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3351 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3351 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3351 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3351 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46879] The complementary binding of VGAM3351 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3351 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3351 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3351 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46880] It is appreciated that VGAM3351 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3351 host target genes. The mRNA of each one of this plurality of VGAM3351 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3351 RNA, herein designated VGAM

RNA, and which when bound by VGAM3351 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3351 host target proteins.

[46881] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3351 gene, herein designated VGAM GENE, on one or more VGAM3351 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46882] It is yet further appreciated that a function of VGAM3351 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3351 include diagnosis, prevention and treatment of viral infection by White clover mosaic virus. Specific functions, and accordingly utilities, of VGAM3351 correlate with, and may be deduced from, the identity of the host target genes which VGAM3351 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46883] Nucleotide sequences of the VGAM3351 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3351 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3351 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3351 are further described hereinbelow with reference to Table 1.

[46884] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3351 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46885] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3352 (VGAM3352) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46886] VGAM3352 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3352 was detected is described hereinabove with reference to Figs. 2-8.

[46887] VGAM3352 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Variola virus. VGAM3352 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46888] VGAM3352 gene, herein designated VGAM GENE, encodes a VGAM3352 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3352 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3352 precursor RNA is designated SEQ ID:75403, and is provided hereinbelow with reference to the sequence listing part.

[46889] VGAM3352 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3352 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46890] An enzyme complex designated DICER COMPLEX, dices the VGAM3352 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3352 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3352 RNA is designated SEQ ID:75404, and is provided hereinbelow with reference to the sequence listing part.

[46891] VGAM3352 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3352 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3352 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46892] VGAM3352 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3352 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3352 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3352 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3352 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46893] The complementary binding of VGAM3352 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3352 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3352 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3352 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46894] It is appreciated that VGAM3352 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3352 host target genes. The mRNA of each one of this plurality of VGAM3352 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3352 RNA, herein designated VGAM RNA, and which when bound by VGAM3352 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3352 host target proteins.

[46895] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3352 gene, herein designated VGAM GENE, on one

or more VGAM3352 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46896] It is yet further appreciated that a function of VGAM3352 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3352 include diagnosis, prevention and treatment of viral infection by Variola virus. Specific functions, and accordingly utilities, of VGAM3352 correlate with, and may be deduced from, the identity of the host target genes which VGAM3352 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46897] Nucleotide sequences of the VGAM3352 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3352 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3352 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3352 are further described hereinbelow with reference to Table 1.

[46898] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3352 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46899] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3353 (VGAM3353) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46900] VGAM3353 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3353 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[46901] VGAM3353 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 53. VGAM3353 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46902] VGAM3353 gene, herein designated VGAM GENE, encodes a VGAM3353 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3353 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3353 precursor RNA is designated SEQ ID:75408, and is provided hereinbelow with reference to the sequence listing part.

[46903] VGAM3353 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3353 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46904] An enzyme complex designated DICER COMPLEX, dices the VGAM3353 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3353 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3353 RNA is designated SEQ ID:75409, and is provided hereinbelow with reference to the sequence listing part.

[46905] VGAM3353 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3353 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3353 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46906] VGAM3353 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3353 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3353 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3353 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3353 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46907] The complementary binding of VGAM3353 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3353 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3353 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3353 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46908] It is appreciated that VGAM3353 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3353 host target genes. The mRNA of each one of this plurality of VGAM3353 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3353 RNA, herein designated VGAM RNA, and which when bound by VGAM3353 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3353 host target proteins.

[46909] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3353 gene, herein designated VGAM GENE, on one or more VGAM3353 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46910] It is yet further appreciated that a function of VGAM3353 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3353 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 53. Specific functions, and accordingly utilities, of VGAM3353 correlate with, and may be deduced from, the identity of the host target genes which VGAM3353 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46911] Nucleotide sequences of the VGAM3353 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3353 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3353 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3353 are further described hereinbelow with reference to Table 1.

[46912] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3353 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46913] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3354 (VGAM3354) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46914] VGAM3354 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3354 was detected is described hereinabove with reference to Figs. 2-8.

[46915] VGAM3354 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3354 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46916] VGAM3354 gene, herein designated VGAM GENE, encodes a VGAM3354 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3354 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3354 precursor RNA is designated SEQ ID:75420, and is provided hereinbelow with reference to the sequence listing part.

[46917] VGAM3354 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3354 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[46918] An enzyme complex designated DICER COMPLEX, dices the VGAM3354 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3354 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3354 RNA is designated SEQ ID:75421, and is provided hereinbelow with reference to the sequence listing part.

[46919] VGAM3354 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3354 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3354 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46920] VGAM3354 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3354 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3354 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3354 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3354 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46921] The complementary binding of VGAM3354 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3354 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3354 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3354 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46922] It is appreciated that VGAM3354 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3354 host target genes. The mRNA of each one of this plurality of VGAM3354 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3354 RNA, herein designated VGAM RNA, and which when bound by VGAM3354 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3354 host target proteins.

[46923] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3354 gene, herein designated VGAM GENE, on one or more VGAM3354 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46924] It is yet further appreciated that a function of VGAM3354 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3354 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3354 correlate with, and may be deduced from, the identity of the host target genes which VGAM3354 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46925] Nucleotide sequences of the VGAM3354 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3354 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3354 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3354 are further described hereinbelow with reference to Table 1.

[46926] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3354 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46927] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3355 (VGAM3355) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46928] VGAM3355 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3355 was detected is described hereinabove with reference to Figs. 2-8.

[46929] VGAM3355 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Tobacco vein mottling virus. VGAM3355 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46930] VGAM3355 gene, herein designated VGAM GENE, encodes a VGAM3355 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3355 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3355 precursor RNA is designated SEQ ID:75425, and is provided hereinbelow with reference to the sequence listing part.

[46931] VGAM3355 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3355 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46932] An enzyme complex designated DICER COMPLEX, dices the VGAM3355 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3355 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3355 RNA is designated SEQ ID:75426, and is provided hereinbelow with reference to the sequence listing part.

[46933] VGAM3355 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3355 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3355 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46934] VGAM3355 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3355 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3355 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3355 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3355 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46935] The complementary binding of VGAM3355 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3355 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3355 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3355 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46936] It is appreciated that VGAM3355 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3355 host target genes. The mRNA of each one of this plurality of VGAM3355 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3355 RNA, herein designated VGAM RNA, and which when bound by VGAM3355 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3355 host target proteins.

[46937] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3355 gene, herein designated VGAM GENE, on one or more VGAM3355 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46938] It is yet further appreciated that a function of VGAM3355 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3355 include diagnosis, prevention and treatment of viral infection by Tobacco vein mottling virus. Specific functions, and accordingly utilities, of VGAM3355 correlate with, and may be deduced from, the identity of the host target genes which VGAM3355 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46939] Nucleotide sequences of the VGAM3355 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3355 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3355 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3355 are further described hereinbelow with reference to Table 1.

[46940] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3355 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46941] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3356 (VGAM3356) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46942] VGAM3356 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3356 was detected is described hereinabove with reference to Figs. 2-8.

[46943] VGAM3356 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pestivirus Giraffe-1.

VGAM3356 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46944] VGAM3356 gene, herein designated VGAM GENE, encodes a VGAM3356 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3356 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3356 precursor RNA is designated SEQ ID:75438, and is provided hereinbelow with reference to the sequence listing part.

[46945] VGAM3356 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3356 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46946] An enzyme complex designated DICER COMPLEX, dices

the VGAM3356 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3356 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3356 RNA is designated SEQ ID:75439, and is provided hereinbelow with reference to the sequence listing part.

[46947] VGAM3356 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3356 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3356 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46948] VGAM3356 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3356 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3356 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3356 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3356 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46949] The complementary binding of VGAM3356 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3356 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3356 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3356 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46950] It is appreciated that VGAM3356 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3356 host target genes. The mRNA of each one of this plurality of VGAM3356 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3356 RNA, herein designated VGAM RNA, and which when bound by VGAM3356 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3356 host target proteins.

[46951] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3356 gene, herein designated VGAM GENE, on one or more VGAM3356 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46952] It is yet further appreciated that a function of VGAM3356 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3356 include diagnosis, prevention and treatment of viral infection by Pestivirus Giraffe-1. Specific functions, and accordingly utilities, of VGAM3356 correlate with, and may be deduced from, the identity of the host target genes which VGAM3356 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46953] Nucleotide sequences of the VGAM3356 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3356 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3356 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3356 are further described hereinbelow with reference to Table 1.

[46954] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3356 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46955] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3357 (VGAM3357) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46956] VGAM3357 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3357 was detected is described hereinabove with reference to Figs. 2-8.

[46957] VGAM3357 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Mushroom bacilliform virus. VGAM3357 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46958] VGAM3357 gene, herein designated VGAM GENE, encodes a VGAM3357 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3357 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3357 precursor RNA is designated SEQ ID:75449, and is provided hereinbelow with reference to the sequence listing part.

[46959] VGAM3357 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3357 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46960] An enzyme complex designated DICER COMPLEX, dices the VGAM3357 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3357 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3357 RNA is designated SEQ ID:75450, and is provided hereinbelow with reference to the sequence listing part.

[46961] VGAM3357 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3357 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3357 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46962] VGAM3357 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3357 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3357 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3357 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3357 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46963] The complementary binding of VGAM3357 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3357 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3357

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3357 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46964] It is appreciated that VGAM3357 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3357 host target genes. The mRNA of each one of this plurality of VGAM3357 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3357 RNA, herein designated VGAM RNA, and which when bound by VGAM3357 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3357 host target proteins.

[46965] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3357 gene, herein designated VGAM GENE, on one or more VGAM3357 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46966] It is yet further appreciated that a function of VGAM3357 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3357 include diagnosis, prevention and treatment of viral infection by Mushroom bacilliform virus. Specific functions, and accordingly utilities, of VGAM3357 correlate with, and may be deduced from, the identity of the host target genes which VGAM3357 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46967] Nucleotide sequences of the VGAM3357 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3357 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3357 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3357 are further described hereinbelow with reference to Table 1.

[46968] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3357 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46969] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3358 (VGAM3358) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46970] VGAM3358 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3358 was detected is described hereinabove with reference to Figs. 2-8.

[46971] VGAM3358 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Maize dwarf mosaic virus. VGAM3358 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[46972] VGAM3358 gene, herein designated VGAM GENE, encodes a VGAM3358 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3358 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3358 precursor RNA is designated SEQ ID:75456, and is provided hereinbelow with reference to the sequence listing part.

[46973] VGAM3358 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3358 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46974] An enzyme complex designated DICER COMPLEX, dices the VGAM3358 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3358 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3358 RNA is designated SEQ ID:75457, and is provided hereinbelow with reference to the sequence listing part.

[46975] VGAM3358 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3358 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3358 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46976] VGAM3358 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3358 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3358 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3358 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3358 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46977] The complementary binding of VGAM3358 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3358 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3358 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3358 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46978] It is appreciated that VGAM3358 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3358 host target genes. The mRNA of each one of this plurality of VGAM3358 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3358 RNA, herein designated VGAM RNA, and which when bound by VGAM3358 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3358 host target proteins.

[46979] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3358 gene, herein designated VGAM GENE, on one or more VGAM3358 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46980] It is yet further appreciated that a function of VGAM3358 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3358 include diagnosis, prevention and treatment of viral infection by Maize dwarf mosaic virus. Specific functions, and accordingly utilities, of VGAM3358 correlate with, and may be deduced from, the identity of the host target genes which VGAM3358 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46981] Nucleotide sequences of the VGAM3358 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3358 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3358 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3358 are further

described hereinbelow with reference to Table 1.

[46982] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3358 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46983] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3359 (VGAM3359) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46984] VGAM3359 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3359 was detected is described hereinabove with reference to Figs. 2-8.

[46985] VGAM3359 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lumpy skin disease virus. VGAM3359 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[46986] VGAM3359 gene, herein designated VGAM GENE, encodes a VGAM3359 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3359 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3359 precursor RNA is designated SEQ ID:75459, and is provided hereinbelow with reference to the sequence listing part.

[46987] VGAM3359 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3359 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[46988] An enzyme complex designated DICER COMPLEX, dices the VGAM3359 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3359 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3359 RNA is designated SEQ ID:75460, and is provided hereinbelow with reference to the sequence listing part.

[46989] VGAM3359 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3359 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3359 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[46990] VGAM3359 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3359 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3359 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3359 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3359 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[46991] The complementary binding of VGAM3359 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3359 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3359 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3359 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[46992] It is appreciated that VGAM3359 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3359 host target genes. The mRNA of each one of this plurality of VGAM3359 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3359 RNA, herein designated VGAM RNA, and which when bound by VGAM3359 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3359 host target proteins.

[46993] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3359 gene, herein designated VGAM GENE, on one or more VGAM3359 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[46994] It is yet further appreciated that a function of VGAM3359 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3359 include diagnosis, prevention and treatment of viral infection by Lumpy skin disease virus. Specific functions, and accordingly utilities, of VGAM3359 correlate with, and may be deduced from, the identity of the host target genes which VGAM3359 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[46995] Nucleotide sequences of the VGAM3359 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3359 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3359 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3359 are further described hereinbelow with reference to Table 1.

[46996] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3359 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[46997] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3360 (VGAM3360) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[46998] VGAM3360 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3360 was detected is described hereinabove with reference to Figs. 2-8.

[46999] VGAM3360 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lumpy skin disease virus. VGAM3360 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47000] VGAM3360 gene, herein designated VGAM GENE, encodes

a VGAM3360 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3360 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3360 precursor RNA is designated SEQ ID:75467, and is provided hereinbelow with reference to the sequence listing part.

[47001] VGAM3360 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3360 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47002] An enzyme complex designated DICER COMPLEX, dices the VGAM3360 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3360 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3360 RNA is designated SEQ ID:75468, and is provided hereinbelow with reference to the sequence listing part.

[47003] VGAM3360 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3360 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3360 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47004] VGAM3360 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3360 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3360 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3360 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3360 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47005] The complementary binding of VGAM3360 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3360 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3360 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3360 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[47006] It is appreciated that VGAM3360 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3360 host target genes. The mRNA of each one of this plurality of VGAM3360 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3360 RNA, herein designated VGAM RNA, and which when bound by VGAM3360 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3360 host target proteins.

[47007] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3360 gene, herein designated VGAM GENE, on one or more VGAM3360 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47008] It is yet further appreciated that a function of VGAM3360 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3360 include diagnosis, prevention and treatment of viral infection by Lumpy skin disease virus. Specific functions, and accordingly utilities, of VGAM3360 correlate with, and may be deduced from, the identity of the host target genes which VGAM3360 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47009] Nucleotide sequences of the VGAM3360 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3360 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3360 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3360 are further described hereinbelow with reference to Table 1.

[47010] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3360 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47011] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3361 (VGAM3361) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47012] VGAM3361 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3361 was detected is described hereinabove with reference to Figs. 2-8.

[47013] VGAM3361 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6B. VGAM3361 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47014] VGAM3361 gene, herein designated VGAM GENE, encodes a VGAM3361 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3361 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3361 precursor RNA is designated SEQ ID:75474, and is provided hereinbelow with reference to the sequence listing part.

[47015] VGAM3361 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3361 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47016] An enzyme complex designated DICER COMPLEX, dices the VGAM3361 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3361 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3361 RNA is designated SEQ ID:75475, and is provided hereinbelow with reference to the sequence listing part.

[47017] VGAM3361 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3361 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3361 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47018] VGAM3361 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3361 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3361 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3361 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3361 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47019] The complementary binding of VGAM3361 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3361 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3361 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3361 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47020] It is appreciated that VGAM3361 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3361 host target genes. The mRNA of each one of this plurality of VGAM3361 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3361 RNA, herein designated VGAM RNA, and which when bound by VGAM3361 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3361 host target proteins.

[47021] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3361 gene, herein designated VGAM GENE, on one or more VGAM3361 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47022] It is yet further appreciated that a function of VGAM3361 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3361 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6B. Specific functions, and accordingly utilities, of VGAM3361 correlate with, and may be deduced from, the identity of the host target genes which VGAM3361 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47023] Nucleotide sequences of the VGAM3361 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3361 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3361 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3361 are further described hereinbelow with reference to Table 1.

[47024] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3361 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47025] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3362 (VGAM3362) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47026] VGAM3362 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3362 was detected is described hereinabove with reference to Figs. 2-8.

[47027] VGAM3362 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3362 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47028] VGAM3362 gene, herein designated VGAM GENE, encodes a VGAM3362 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3362 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3362 precursor RNA is designated SEQ ID:75495, and is provided hereinbelow with reference to the sequence listing part.

[47029] VGAM3362 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3362 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47030] An enzyme complex designated DICER COMPLEX, dices the VGAM3362 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3362 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3362 RNA is designated SEQ ID:75496, and is provided hereinbelow with reference to the sequence listing part.

[47031] VGAM3362 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3362 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3362 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47032] VGAM3362 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3362 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3362 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3362 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3362 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47033] The complementary binding of VGAM3362 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3362 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3362 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3362 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47034] It is appreciated that VGAM3362 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3362 host target genes. The mRNA of each one of this plurality of VGAM3362 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3362 RNA, herein designated VGAM RNA, and which when bound by VGAM3362 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3362 host target proteins.

[47035] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3362 gene, herein designated VGAM GENE, on one or more VGAM3362 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47036] It is yet further appreciated that a function of VGAM3362 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3362 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3362 correlate with, and may be deduced from, the identity of the host target genes which VGAM3362 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47037] Nucleotide sequences of the VGAM3362 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3362 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3362 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3362 are further described hereinbelow with reference to Table 1.

[47038] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3362 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47039] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3363 (VGAM3363) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47040] VGAM3363 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3363 was detected is described hereinabove with reference to Figs. 2–8.

[47041] VGAM3363 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 3. VGAM3363 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47042] VGAM3363 gene, herein designated VGAM GENE, encodes a VGAM3363 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3363 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3363 precursor RNA is designated SEQ ID:75506, and is provided hereinbelow with reference to the sequence listing part.

[47043] VGAM3363 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3363 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47044] An enzyme complex designated DICER COMPLEX, dices the VGAM3363 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3363 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3363 RNA is designated SEQ ID:75507, and is provided hereinbelow with reference to the sequence listing part.

[47045] VGAM3363 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3363 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3363 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47046] VGAM3363 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3363 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3363 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3363 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3363 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47047] The complementary binding of VGAM3363 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3363 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3363 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3363 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47048] It is appreciated that VGAM3363 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3363 host target genes. The mRNA of each one of this plurality of VGAM3363 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3363 RNA, herein designated VGAM RNA, and which when bound by VGAM3363 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3363 host target proteins.

[47049] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3363 gene, herein designated VGAM GENE, on one or more VGAM3363 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [47050] It is yet further appreciated that a function of VGAM3363 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3363 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3363 correlate with, and may be deduced from, the identity of the host target genes which VGAM3363 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [47051] Nucleotide sequences of the VGAM3363 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3363 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3363 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3363 are further described hereinbelow with reference to Table 1.
- [47052] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3363 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47053] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3364 (VGAM3364) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47054] VGAM3364 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3364 was detected is described hereinabove with reference to Figs. 2–8.

[47055] VGAM3364 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3364 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47056] VGAM3364 gene, herein designated VGAM GENE, encodes a VGAM3364 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3364 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3364 precursor RNA is designated SEQ ID:75513, and is provided hereinbelow with reference to the sequence listing part.

[47057] VGAM3364 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3364 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47058] An enzyme complex designated DICER COMPLEX, dices the VGAM3364 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3364 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3364 RNA is designated SEQ ID:75514, and is provided hereinbelow with reference to the sequence listing part.

[47059] VGAM3364 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3364 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3364 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47060] VGAM3364 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3364 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3364 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3364 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3364 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47061] The complementary binding of VGAM3364 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3364 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3364 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3364 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47062] It is appreciated that VGAM3364 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3364 host target genes. The mRNA of

each one of this plurality of VGAM3364 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3364 RNA, herein designated VGAM RNA, and which when bound by VGAM3364 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3364 host target proteins.

[47063] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3364 gene, herein designated VGAM GENE, on one or more VGAM3364 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[47064] It is yet further appreciated that a function of VGAM3364 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3364 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3364 correlate with, and may be deduced from, the identity of the host target genes which VGAM3364 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47065] Nucleotide sequences of the VGAM3364 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3364 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3364 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3364 are further described hereinbelow with reference to Table 1.

[47066] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3364 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[47067] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3365 (VGAM3365) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47068] VGAM3365 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3365 was detected is described hereinabove with reference to Figs. 2–8.

[47069] VGAM3365 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3365 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47070] VGAM3365 gene, herein designated VGAM GENE, encodes a VGAM3365 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3365 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3365 precursor RNA is designated SEQ ID:75557, and is provided hereinbelow with reference to the sequence listing part.

[47071] VGAM3365 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3365 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47072] An enzyme complex designated DICER COMPLEX, dices the VGAM3365 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3365 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3365 RNA is designated SEQ ID:75558,

and is provided hereinbelow with reference to the sequence listing part.

[47073] VGAM3365 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3365 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3365 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47074] VGAM3365 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3365 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3365 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3365 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3365 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47075] The complementary binding of VGAM3365 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3365 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3365 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3365 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47076] It is appreciated that VGAM3365 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3365 host target genes. The mRNA of each one of this plurality of VGAM3365 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3365 RNA, herein designated VGAM RNA, and which when bound by VGAM3365 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3365 host target proteins.

[47077] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3365 gene, herein designated VGAM GENE, on one or more VGAM3365 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47078] It is yet further appreciated that a function of VGAM3365 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3365 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3365 correlate with, and may be deduced from, the identity of the host target genes which VGAM3365 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47079] Nucleotide sequences of the VGAM3365 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3365 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3365 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3365 are further described hereinbelow with reference to Table 1.

[47080] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3365 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47081] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3366 (VGAM3366) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47082] VGAM3366 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3366 was detected is described hereinabove with reference to Figs. 2–8.

[47083] VGAM3366 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3366 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47084] VGAM3366 gene, herein designated VGAM GENE, encodes a VGAM3366 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3366 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3366 precu-

sor RNA is designated SEQ ID:75562, and is provided hereinbelow with reference to the sequence listing part.

[47085] VGAM3366 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3366 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47086] An enzyme complex designated DICER COMPLEX, dices the VGAM3366 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3366 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3366 RNA is designated SEQ ID:75563, and is provided hereinbelow with reference to the se-

quence listing part.

[47087] VGAM3366 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3366 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3366 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47088] VGAM3366 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3366 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3366 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3366 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3366 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47089] The complementary binding of VGAM3366 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3366 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3366 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3366 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47090] It is appreciated that VGAM3366 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3366 host target genes. The mRNA of each one of this plurality of VGAM3366 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3366 RNA, herein designated VGAM RNA, and which when bound by VGAM3366 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3366 host target proteins.

[47091] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3366 gene, herein designated VGAM GENE, on one or more VGAM3366 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47092] It is yet further appreciated that a function of VGAM3366

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3366 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3366 correlate with, and may be deduced from, the identity of the host target genes which VGAM3366 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47093] Nucleotide sequences of the VGAM3366 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3366 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3366 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3366 are further described hereinbelow with reference to Table 1.

[47094] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3366 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47095] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3367 (VGAM3367) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47096] VGAM3367 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3367 was detected is described hereinabove with reference to Figs. 2–8.

[47097] VGAM3367 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3367 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47098] VGAM3367 gene, herein designated VGAM GENE, encodes a VGAM3367 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3367 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3367 precursor RNA is designated SEQ ID:75586, and is provided

hereinbelow with reference to the sequence listing part.

[47099] VGAM3367 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3367 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47100] An enzyme complex designated DICER COMPLEX, dices the VGAM3367 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3367 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3367 RNA is designated SEQ ID:75587, and is provided hereinbelow with reference to the sequence listing part.

[47101] VGAM3367 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3367 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3367 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47102] VGAM3367 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3367 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3367 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3367 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3367 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47103] The complementary binding of VGAM3367 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3367 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3367 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3367 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47104] It is appreciated that VGAM3367 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3367 host target genes. The mRNA of each one of this plurality of VGAM3367 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3367 RNA, herein designated VGAM RNA, and which when bound by VGAM3367 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3367 host target proteins.

[47105] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3367 gene, herein designated VGAM GENE, on one or more VGAM3367 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47106] It is yet further appreciated that a function of VGAM3367 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3367 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3367 correlate with, and may be deduced from, the identity of the host target genes which VGAM3367 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47107] Nucleotide sequences of the VGAM3367 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3367 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3367 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3367 are further described hereinbelow with reference to Table 1.

[47108] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3367 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47109] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3368 (VGAM3368) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47110] VGAM3368 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3368 was detected is described hereinabove with reference to Figs. 2–8.

[47111] VGAM3368 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3368 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47112] VGAM3368 gene, herein designated VGAM GENE, encodes a VGAM3368 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3368 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3368 precursor RNA is designated SEQ ID:75628, and is provided hereinbelow with reference to the sequence listing part.

[47113] VGAM3368 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3368 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47114] An enzyme complex designated DICER COMPLEX, dices the VGAM3368 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3368 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3368 RNA is designated SEQ ID:75629, and is provided hereinbelow with reference to the sequence listing part.

[47115] VGAM3368 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3368 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3368 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47116] VGAM3368 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3368 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3368 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3368 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3368 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47117] The complementary binding of VGAM3368 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3368 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3368 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3368 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47118] It is appreciated that VGAM3368 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3368 host target genes. The mRNA of each one of this plurality of VGAM3368 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3368 RNA, herein designated VGAM

RNA, and which when bound by VGAM3368 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3368 host target proteins.

[47119] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3368 gene, herein designated VGAM GENE, on one or more VGAM3368 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47120] It is yet further appreciated that a function of VGAM3368 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3368 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3368 correlate with, and may be deduced from, the identity of the host target genes which VGAM3368 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47121] Nucleotide sequences of the VGAM3368 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3368 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3368 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3368 are further described hereinbelow with reference to Table 1.

[47122] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3368 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47123] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3369 (VGAM3369) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47124] VGAM3369 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3369 was detected is described hereinabove with reference to Figs. 2–8.

[47125] VGAM3369 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 70. VGAM3369 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47126] VGAM3369 gene, herein designated VGAM GENE, encodes a VGAM3369 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3369 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3369 precursor RNA is designated SEQ ID:75635, and is provided hereinbelow with reference to the sequence listing part.

[47127] VGAM3369 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3369 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47128] An enzyme complex designated DICER COMPLEX, dices the VGAM3369 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3369 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3369 RNA is designated SEQ ID:75636, and is provided hereinbelow with reference to the sequence listing part.

[47129] VGAM3369 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3369 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3369 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47130] VGAM3369 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3369 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3369 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3369 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3369 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47131] The complementary binding of VGAM3369 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3369 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3369 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3369 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47132] It is appreciated that VGAM3369 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3369 host target genes. The mRNA of each one of this plurality of VGAM3369 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3369 RNA, herein designated VGAM RNA, and which when bound by VGAM3369 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3369 host target proteins.

[47133] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3369 gene, herein designated VGAM GENE, on one or more VGAM3369 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47134] It is yet further appreciated that a function of VGAM3369 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3369 include diagnosis, prevention and

treatment of viral infection by Human papillomavirus type 70. Specific functions, and accordingly utilities, of VGAM3369 correlate with, and may be deduced from, the identity of the host target genes which VGAM3369 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47135] Nucleotide sequences of the VGAM3369 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3369 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3369 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3369 are further described hereinbelow with reference to Table 1.

[47136] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3369 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47137] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3370 (VGAM3370) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47138] VGAM3370 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3370 was detected is described hereinabove with reference to Figs. 2–8.

[47139] VGAM3370 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Macaca mulatta rhadinovirus. VGAM3370 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47140] VGAM3370 gene, herein designated VGAM GENE, encodes a VGAM3370 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3370 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3370 precursor RNA is designated SEQ ID:75708, and is provided hereinbelow with reference to the sequence listing part.

[47141] VGAM3370 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3370 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47142] An enzyme complex designated DICER COMPLEX, dices the VGAM3370 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3370 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3370 RNA is designated SEQ ID:75709, and is provided hereinbelow with reference to the sequence listing part.

[47143] VGAM3370 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3370 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3370 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47144] VGAM3370 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3370 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3370 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3370 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3370 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47145] The complementary binding of VGAM3370 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3370 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3370 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3370 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47146] It is appreciated that VGAM3370 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3370 host target genes. The mRNA of each one of this plurality of VGAM3370 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3370 RNA, herein designated VGAM RNA, and which when bound by VGAM3370 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3370 host target proteins.

[47147] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3370 gene, herein designated VGAM GENE, on one or more VGAM3370 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47148] It is yet further appreciated that a function of VGAM3370 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3370 include diagnosis, prevention and treatment of viral infection by *Macaca mulatta* rhadi-

novirus. Specific functions, and accordingly utilities, of VGAM3370 correlate with, and may be deduced from, the identity of the host target genes which VGAM3370 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47149] Nucleotide sequences of the VGAM3370 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3370 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3370 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3370 are further described hereinbelow with reference to Table 1.

[47150] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3370 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47151] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3371 (VGAM3371) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[47152] VGAM3371 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3371 was detected is described hereinabove with reference to Figs. 2–8.

[47153] VGAM3371 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Peanut bud necrosis virus. VGAM3371 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47154] VGAM3371 gene, herein designated VGAM GENE, encodes a VGAM3371 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3371 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3371 precursor RNA is designated SEQ ID:75747, and is provided hereinbelow with reference to the sequence listing part.

[47155] VGAM3371 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3371 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47156] An enzyme complex designated DICER COMPLEX, dices the VGAM3371 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3371 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3371 RNA is designated SEQ ID:75748, and is provided hereinbelow with reference to the sequence listing part.

[47157] VGAM3371 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3371 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3371 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47158] VGAM3371 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3371 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3371 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3371 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3371 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47159] The complementary binding of VGAM3371 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3371 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3371 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3371 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47160] It is appreciated that VGAM3371 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3371 host target genes. The mRNA of each one of this plurality of VGAM3371 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3371 RNA, herein designated VGAM RNA, and which when bound by VGAM3371 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3371 host target proteins.

[47161] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3371 gene, herein designated VGAM GENE, on one or more VGAM3371 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47162] It is yet further appreciated that a function of VGAM3371 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3371 include diagnosis, prevention and treatment of viral infection by Peanut bud necrosis virus. Specific functions, and accordingly utilities, of VGAM3371

correlate with, and may be deduced from, the identity of the host target genes which VGAM3371 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47163] Nucleotide sequences of the VGAM3371 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3371 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3371 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3371 are further described hereinbelow with reference to Table 1.

[47164] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3371 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47165] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3372 (VGAM3372) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[47166] VGAM3372 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3372 was detected is described hereinabove with reference to Figs. 2–8.

[47167] VGAM3372 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3372 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47168] VGAM3372 gene, herein designated VGAM GENE, encodes a VGAM3372 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3372 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3372 precursor RNA is designated SEQ ID:75775, and is provided hereinbelow with reference to the sequence listing part.

[47169] VGAM3372 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3372 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47170] An enzyme complex designated DICER COMPLEX, dices the VGAM3372 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3372 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3372 RNA is designated SEQ ID:75776, and is provided hereinbelow with reference to the sequence listing part.

[47171] VGAM3372 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3372 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3372 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47172] VGAM3372 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3372 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3372 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3372 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3372 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47173] The complementary binding of VGAM3372 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3372 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3372 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3372 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47174] It is appreciated that VGAM3372 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3372 host target genes. The mRNA of each one of this plurality of VGAM3372 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3372 RNA, herein designated VGAM RNA, and which when bound by VGAM3372 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3372 host target proteins.

[47175] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3372 gene, herein designated VGAM GENE, on one or more VGAM3372 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47176] It is yet further appreciated that a function of VGAM3372 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3372 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3372 correlate with, and may be deduced

from, the identity of the host target genes which VGAM3372 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47177] Nucleotide sequences of the VGAM3372 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3372 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3372 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3372 are further described hereinbelow with reference to Table 1.

[47178] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3372 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47179] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3373 (VGAM3373) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47180] VGAM3373 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3373 was detected is described hereinabove with reference to Figs. 2–8.

[47181] VGAM3373 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3373 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47182] VGAM3373 gene, herein designated VGAM GENE, encodes a VGAM3373 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3373 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3373 precursor RNA is designated SEQ ID:75784, and is provided hereinbelow with reference to the sequence listing part.

[47183] VGAM3373 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3373 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47184] An enzyme complex designated DICER COMPLEX, dices the VGAM3373 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3373 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3373 RNA is designated SEQ ID:75785, and is provided hereinbelow with reference to the sequence listing part.

[47185] VGAM3373 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3373 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3373 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47186] VGAM3373 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3373 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3373 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3373 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3373 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47187] The complementary binding of VGAM3373 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3373 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3373 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3373 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47188] It is appreciated that VGAM3373 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3373 host target genes. The mRNA of each one of this plurality of VGAM3373 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3373 RNA, herein designated VGAM RNA, and which when bound by VGAM3373 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3373 host target proteins.

[47189] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3373 gene, herein designated VGAM GENE, on one or more VGAM3373 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47190] It is yet further appreciated that a function of VGAM3373 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3373 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3373 correlate with, and may be deduced from, the identity of the host target genes which

VGAM3373 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47191] Nucleotide sequences of the VGAM3373 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3373 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3373 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3373 are further described hereinbelow with reference to Table 1.

[47192] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3373 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47193] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3374 (VGAM3374) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47194] VGAM3374 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3374 was detected is described hereinabove with reference to Figs. 2–8.

[47195] VGAM3374 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rabbit oral papillomavirus. VGAM3374 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47196] VGAM3374 gene, herein designated VGAM GENE, encodes a VGAM3374 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3374 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3374 precursor RNA is designated SEQ ID:75800, and is provided hereinbelow with reference to the sequence listing part.

[47197] VGAM3374 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3374 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47198] An enzyme complex designated DICER COMPLEX, dices the VGAM3374 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3374 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3374 RNA is designated SEQ ID:75801, and is provided hereinbelow with reference to the sequence listing part.

[47199] VGAM3374 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3374 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3374 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47200] VGAM3374 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3374 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3374 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3374 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3374 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[47201] The complementary binding of VGAM3374 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3374 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3374 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3374 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47202] It is appreciated that VGAM3374 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3374 host target genes. The mRNA of each one of this plurality of VGAM3374 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3374 RNA, herein designated VGAM RNA, and which when bound by VGAM3374 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3374 host target proteins.

[47203] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3374 gene, herein designated VGAM GENE, on one or more VGAM3374 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47204] It is yet further appreciated that a function of VGAM3374 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3374 include diagnosis, prevention and treatment of viral infection by Rabbit oral papillomavirus. Specific functions, and accordingly utilities, of VGAM3374 correlate with, and may be deduced from, the identity of the host target genes which VGAM3374 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[47205] Nucleotide sequences of the VGAM3374 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3374 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3374 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3374 are further described hereinbelow with reference to Table 1.

[47206] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3374 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47207] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3375 (VGAM3375) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47208] VGAM3375 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3375 was detected is described hereinabove with reference to Figs. 2–8.

[47209] VGAM3375 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rabbit oral papillomavirus. VGAM3375 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47210] VGAM3375 gene, herein designated VGAM GENE, encodes a VGAM3375 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3375 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3375 precursor RNA is designated SEQ ID:75811, and is provided hereinbelow with reference to the sequence listing part.

[47211] VGAM3375 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3375 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47212] An enzyme complex designated DICER COMPLEX, dices the VGAM3375 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3375 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3375 RNA is designated SEQ ID:75812, and is provided hereinbelow with reference to the sequence listing part.

[47213] VGAM3375 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3375 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3375 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[47214] VGAM3375 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3375 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3375 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3375 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3375 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47215] The complementary binding of VGAM3375 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3375 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3375 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3375 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47216] It is appreciated that VGAM3375 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3375 host target genes. The mRNA of each one of this plurality of VGAM3375 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3375 RNA, herein designated VGAM RNA, and which when bound by VGAM3375 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3375 host target proteins.

[47217] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3375 gene, herein designated VGAM GENE, on one

or more VGAM3375 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47218] It is yet further appreciated that a function of VGAM3375 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3375 include diagnosis, prevention and treatment of viral infection by Rabbit oral papillomavirus. Specific functions, and accordingly utilities, of VGAM3375 correlate with, and may be deduced from, the identity of the host target genes which VGAM3375 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47219] Nucleotide sequences of the VGAM3375 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3375 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3375 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3375 are further described hereinbelow with reference to Table 1.

[47220] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3375 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47221] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3376 (VGAM3376) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47222] VGAM3376 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3376 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[47223] VGAM3376 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 28. VGAM3376 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47224] VGAM3376 gene, herein designated VGAM GENE, encodes a VGAM3376 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3376 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3376 precursor RNA is designated SEQ ID:75824, and is provided hereinbelow with reference to the sequence listing part.

[47225] VGAM3376 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3376 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47226] An enzyme complex designated DICER COMPLEX, dices the VGAM3376 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3376 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3376 RNA is designated SEQ ID:75825, and is provided hereinbelow with reference to the sequence listing part.

[47227] VGAM3376 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3376 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3376 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47228] VGAM3376 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3376 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3376 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3376 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3376 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47229] The complementary binding of VGAM3376 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3376 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3376 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3376 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47230] It is appreciated that VGAM3376 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3376 host target genes. The mRNA of each one of this plurality of VGAM3376 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3376 RNA, herein designated VGAM RNA, and which when bound by VGAM3376 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3376 host target proteins.

[47231] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3376 gene, herein designated VGAM GENE, on one or more VGAM3376 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47232] It is yet further appreciated that a function of VGAM3376 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3376 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 28. Specific functions, and accordingly utilities, of VGAM3376 correlate with, and may be deduced from, the identity of the host target genes which VGAM3376 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47233] Nucleotide sequences of the VGAM3376 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3376 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3376 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3376 are further described hereinbelow with reference to Table 1.

[47234] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3376 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47235] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3377 (VGAM3377) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47236] VGAM3377 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3377 was detected is described hereinabove with reference to Figs. 2-8.

[47237] VGAM3377 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 8. VGAM3377 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47238] VGAM3377 gene, herein designated VGAM GENE, encodes a VGAM3377 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3377 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3377 precursor RNA is designated SEQ ID:75857, and is provided hereinbelow with reference to the sequence listing part.

[47239] VGAM3377 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3377 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[47240] An enzyme complex designated DICER COMPLEX, dices the VGAM3377 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3377 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3377 RNA is designated SEQ ID:75858, and is provided hereinbelow with reference to the sequence listing part.

[47241] VGAM3377 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3377 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3377 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47242] VGAM3377 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3377 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3377 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3377 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3377 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47243] The complementary binding of VGAM3377 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3377 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3377 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3377 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47244] It is appreciated that VGAM3377 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3377 host target genes. The mRNA of each one of this plurality of VGAM3377 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3377 RNA, herein designated VGAM RNA, and which when bound by VGAM3377 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3377 host target proteins.

[47245] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3377 gene, herein designated VGAM GENE, on one or more VGAM3377 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47246] It is yet further appreciated that a function of VGAM3377 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3377 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 8. Specific functions, and accordingly utilities, of VGAM3377 correlate with, and may be deduced from, the identity of the host target genes which VGAM3377 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47247] Nucleotide sequences of the VGAM3377 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3377 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3377 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3377 are further described hereinbelow with reference to Table 1.

[47248] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3377 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47249] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3378 (VGAM3378) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47250] VGAM3378 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3378 was detected is described hereinabove with reference to Figs. 2-8.

[47251] VGAM3378 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Human herpesvirus 5. VGAM3378 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47252] VGAM3378 gene, herein designated VGAM GENE, encodes a VGAM3378 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3378 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3378 precursor RNA is designated SEQ ID:75864, and is provided hereinbelow with reference to the sequence listing part.

[47253] VGAM3378 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3378 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47254] An enzyme complex designated DICER COMPLEX, dices the VGAM3378 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3378 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3378 RNA is designated SEQ ID:75865, and is provided hereinbelow with reference to the sequence listing part.

[47255] VGAM3378 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3378 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3378 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47256] VGAM3378 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3378 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3378 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3378 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3378 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47257] The complementary binding of VGAM3378 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3378 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3378 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3378 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47258] It is appreciated that VGAM3378 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3378 host target genes. The mRNA of each one of this plurality of VGAM3378 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3378 RNA, herein designated VGAM RNA, and which when bound by VGAM3378 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3378 host target proteins.

[47259] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3378 gene, herein designated VGAM GENE, on one or more VGAM3378 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47260] It is yet further appreciated that a function of VGAM3378 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3378 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3378 correlate with, and may be deduced from, the identity of the host target genes which VGAM3378 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47261] Nucleotide sequences of the VGAM3378 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3378 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3378 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3378 are further described hereinbelow with reference to Table 1.

[47262] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3378 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47263] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3379 (VGAM3379) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47264] VGAM3379 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3379 was detected is described hereinabove with reference to Figs. 2-8.

[47265] VGAM3379 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5.

VGAM3379 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47266] VGAM3379 gene, herein designated VGAM GENE, encodes a VGAM3379 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3379 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3379 precursor RNA is designated SEQ ID:75871, and is provided hereinbelow with reference to the sequence listing part.

[47267] VGAM3379 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3379 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47268] An enzyme complex designated DICER COMPLEX, dices

the VGAM3379 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3379 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3379 RNA is designated SEQ ID:75872, and is provided hereinbelow with reference to the sequence listing part.

[47269] VGAM3379 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3379 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3379 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47270] VGAM3379 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3379 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3379 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3379 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3379 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47271] The complementary binding of VGAM3379 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3379 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3379 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3379 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47272] It is appreciated that VGAM3379 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3379 host target genes. The mRNA of each one of this plurality of VGAM3379 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3379 RNA, herein designated VGAM RNA, and which when bound by VGAM3379 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3379 host target proteins.

[47273] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3379 gene, herein designated VGAM GENE, on one or more VGAM3379 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47274] It is yet further appreciated that a function of VGAM3379 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3379 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3379 correlate with, and may be deduced from, the identity of the host target genes which VGAM3379 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47275] Nucleotide sequences of the VGAM3379 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3379 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3379 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3379 are further described hereinbelow with reference to Table 1.

[47276] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3379 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47277] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3380 (VGAM3380) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47278] VGAM3380 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3380 was detected is described hereinabove with reference to Figs. 2-8.

[47279] VGAM3380 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3380 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[47280] VGAM3380 gene, herein designated VGAM GENE, encodes a VGAM3380 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3380 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3380 precursor RNA is designated SEQ ID:75895, and is provided hereinbelow with reference to the sequence listing part.

[47281] VGAM3380 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3380 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47282] An enzyme complex designated DICER COMPLEX, dices the VGAM3380 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3380 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3380 RNA is designated SEQ ID:75896, and is provided hereinbelow with reference to the sequence listing part.

[47283] VGAM3380 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3380 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3380 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47284] VGAM3380 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3380 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3380 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3380 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3380 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47285] The complementary binding of VGAM3380 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3380 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3380

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3380 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47286] It is appreciated that VGAM3380 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3380 host target genes. The mRNA of each one of this plurality of VGAM3380 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3380 RNA, herein designated VGAM RNA, and which when bound by VGAM3380 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3380 host target proteins.

[47287] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3380 gene, herein designated VGAM GENE, on one or more VGAM3380 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47288] It is yet further appreciated that a function of VGAM3380 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3380 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3380 correlate with, and may be deduced from, the identity of the host target genes which VGAM3380 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47289] Nucleotide sequences of the VGAM3380 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3380 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3380 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3380 are further described hereinbelow with reference to Table 1.

[47290] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3380 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47291] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3381 (VGAM3381) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47292] VGAM3381 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3381 was detected is described hereinabove with reference to Figs. 2-8.

[47293] VGAM3381 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3381 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[47294] VGAM3381 gene, herein designated VGAM GENE, encodes a VGAM3381 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3381 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3381 precursor RNA is designated SEQ ID:75918, and is provided hereinbelow with reference to the sequence listing part.

[47295] VGAM3381 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3381 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47296] An enzyme complex designated DICER COMPLEX, dices the VGAM3381 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3381 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3381 RNA is designated SEQ ID:75919, and is provided hereinbelow with reference to the sequence listing part.

[47297] VGAM3381 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3381 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3381 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47298] VGAM3381 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3381 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3381 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3381 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3381 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47299] The complementary binding of VGAM3381 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3381 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3381 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3381 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47300] It is appreciated that VGAM3381 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3381 host target genes. The mRNA of each one of this plurality of VGAM3381 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3381 RNA, herein designated VGAM RNA, and which when bound by VGAM3381 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3381 host target proteins.

[47301] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3381 gene, herein designated VGAM GENE, on one or more VGAM3381 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47302] It is yet further appreciated that a function of VGAM3381 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3381 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3381 correlate with, and may be deduced from, the identity of the host target genes which VGAM3381 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47303] Nucleotide sequences of the VGAM3381 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3381 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3381 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3381 are further

described hereinbelow with reference to Table 1.

[47304] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3381 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47305] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3382 (VGAM3382) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47306] VGAM3382 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3382 was detected is described hereinabove with reference to Figs. 2-8.

[47307] VGAM3382 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3382 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47308] VGAM3382 gene, herein designated VGAM GENE, encodes a VGAM3382 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3382 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3382 precursor RNA is designated SEQ ID:75940, and is provided hereinbelow with reference to the sequence listing part.

[47309] VGAM3382 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3382 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47310] An enzyme complex designated DICER COMPLEX, dices the VGAM3382 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3382 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3382 RNA is designated SEQ ID:75941, and is provided hereinbelow with reference to the sequence listing part.

[47311] VGAM3382 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3382 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3382 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47312] VGAM3382 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3382 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3382 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3382 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3382 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47313] The complementary binding of VGAM3382 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3382 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3382 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3382 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47314] It is appreciated that VGAM3382 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3382 host target genes. The mRNA of each one of this plurality of VGAM3382 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3382 RNA, herein designated VGAM RNA, and which when bound by VGAM3382 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3382 host target proteins.

[47315] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3382 gene, herein designated VGAM GENE, on one or more VGAM3382 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47316] It is yet further appreciated that a function of VGAM3382 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3382 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3382 correlate with, and may be deduced from, the identity of the host target genes which VGAM3382 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47317] Nucleotide sequences of the VGAM3382 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3382 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3382 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3382 are further described hereinbelow with reference to Table 1.

[47318] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3382 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47319] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3383 (VGAM3383) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47320] VGAM3383 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3383 was detected is described hereinabove with reference to Figs. 2-8.

[47321] VGAM3383 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Potato virus A. VGAM3383 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47322] VGAM3383 gene, herein designated VGAM GENE, encodes

a VGAM3383 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3383 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3383 precursor RNA is designated SEQ ID:75959, and is provided hereinbelow with reference to the sequence listing part.

[47323] VGAM3383 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3383 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47324] An enzyme complex designated DICER COMPLEX, dices the VGAM3383 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3383 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3383 RNA is designated SEQ ID:75960, and is provided hereinbelow with reference to the sequence listing part.

[47325] VGAM3383 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3383 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3383 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47326] VGAM3383 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3383 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3383 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3383 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3383 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47327] The complementary binding of VGAM3383 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3383 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3383 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3383 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[47328] It is appreciated that VGAM3383 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3383 host target genes. The mRNA of each one of this plurality of VGAM3383 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3383 RNA, herein designated VGAM RNA, and which when bound by VGAM3383 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3383 host target proteins.

[47329] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3383 gene, herein designated VGAM GENE, on one or more VGAM3383 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47330] It is yet further appreciated that a function of VGAM3383 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3383 include diagnosis, prevention and treatment of viral infection by Potato virus A. Specific functions, and accordingly utilities, of VGAM3383 correlate with, and may be deduced from, the identity of the host target genes which VGAM3383 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47331] Nucleotide sequences of the VGAM3383 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3383 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3383 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3383 are further described hereinbelow with reference to Table 1.

[47332] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3383 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47333] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3384 (VGAM3384) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47334] VGAM3384 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3384 was detected is described hereinabove with reference to Figs. 2-8.

[47335] VGAM3384 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3384 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47336] VGAM3384 gene, herein designated VGAM GENE, encodes a VGAM3384 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3384 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3384 precursor RNA is designated SEQ ID:75969, and is provided hereinbelow with reference to the sequence listing part.

[47337] VGAM3384 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3384 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47338] An enzyme complex designated DICER COMPLEX, dices the VGAM3384 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3384 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3384 RNA is designated SEQ ID:75970, and is provided hereinbelow with reference to the sequence listing part.

[47339] VGAM3384 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3384 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3384 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47340] VGAM3384 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3384 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3384 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3384 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3384 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47341] The complementary binding of VGAM3384 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3384 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3384 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3384 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47342] It is appreciated that VGAM3384 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3384 host target genes. The mRNA of each one of this plurality of VGAM3384 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3384 RNA, herein designated VGAM RNA, and which when bound by VGAM3384 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3384 host target proteins.

[47343] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3384 gene, herein designated VGAM GENE, on one or more VGAM3384 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47344] It is yet further appreciated that a function of VGAM3384 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3384 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3384 correlate with, and may be deduced from, the identity of the host target genes which VGAM3384 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47345] Nucleotide sequences of the VGAM3384 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3384 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3384 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3384 are further described hereinbelow with reference to Table 1.

[47346] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3384 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47347] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3385 (VGAM3385) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47348] VGAM3385 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3385 was detected is described hereinabove with reference to Figs. 2-8.

[47349] VGAM3385 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus. VGAM3385 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47350] VGAM3385 gene, herein designated VGAM GENE, encodes a VGAM3385 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3385 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3385 precursor RNA is designated SEQ ID:75973, and is provided hereinbelow with reference to the sequence listing part.

[47351] VGAM3385 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3385 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47352] An enzyme complex designated DICER COMPLEX, dices the VGAM3385 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3385 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3385 RNA is designated SEQ ID:75974, and is provided hereinbelow with reference to the sequence listing part.

[47353] VGAM3385 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3385 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3385 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47354] VGAM3385 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3385 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3385 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3385 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3385 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47355] The complementary binding of VGAM3385 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3385 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3385 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3385 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47356] It is appreciated that VGAM3385 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3385 host target genes. The mRNA of each one of this plurality of VGAM3385 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3385 RNA, herein designated VGAM RNA, and which when bound by VGAM3385 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3385 host target proteins.

[47357] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3385 gene, herein designated VGAM GENE, on one or more VGAM3385 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47358] It is yet further appreciated that a function of VGAM3385 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3385 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3385 correlate with, and may be deduced from, the identity of the host target genes which VGAM3385 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47359] Nucleotide sequences of the VGAM3385 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3385 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3385 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3385 are further described hereinbelow with reference to Table 1.

[47360] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3385 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47361] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3386 (VGAM3386) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47362] VGAM3386 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3386 was detected is described hereinabove with reference to Figs. 2–8.

[47363] VGAM3386 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 1. VGAM3386 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47364] VGAM3386 gene, herein designated VGAM GENE, encodes a VGAM3386 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3386 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3386 precursor RNA is designated SEQ ID:75990, and is provided hereinbelow with reference to the sequence listing part.

[47365] VGAM3386 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3386 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47366] An enzyme complex designated DICER COMPLEX, dices the VGAM3386 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3386 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3386 RNA is designated SEQ ID:75991, and is provided hereinbelow with reference to the sequence listing part.

[47367] VGAM3386 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3386 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3386 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47368] VGAM3386 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3386 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3386 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3386 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3386 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47369] The complementary binding of VGAM3386 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3386 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3386 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3386 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47370] It is appreciated that VGAM3386 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3386 host target genes. The mRNA of each one of this plurality of VGAM3386 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3386 RNA, herein designated VGAM RNA, and which when bound by VGAM3386 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3386 host target proteins.

[47371] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3386 gene, herein designated VGAM GENE, on one or more VGAM3386 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [47372] It is yet further appreciated that a function of VGAM3386 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3386 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3386 correlate with, and may be deduced from, the identity of the host target genes which VGAM3386 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [47373] Nucleotide sequences of the VGAM3386 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3386 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3386 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3386 are further described hereinbelow with reference to Table 1.
- [47374] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3386 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47375] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3387 (VGAM3387) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47376] VGAM3387 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3387 was detected is described hereinabove with reference to Figs. 2-8.

[47377] VGAM3387 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Influenza A virus. VGAM3387 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47378] VGAM3387 gene, herein designated VGAM GENE, encodes a VGAM3387 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3387 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3387 precursor RNA is designated SEQ ID:75997, and is provided hereinbelow with reference to the sequence listing part.

[47379] VGAM3387 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3387 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47380] An enzyme complex designated DICER COMPLEX, dices the VGAM3387 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3387 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3387 RNA is designated SEQ ID:75998, and is provided hereinbelow with reference to the sequence listing part.

[47381] VGAM3387 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3387 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3387 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47382] VGAM3387 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3387 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3387 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3387 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3387 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47383] The complementary binding of VGAM3387 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3387 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3387 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3387 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47384] It is appreciated that VGAM3387 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3387 host target genes. The mRNA of

each one of this plurality of VGAM3387 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3387 RNA, herein designated VGAM RNA, and which when bound by VGAM3387 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3387 host target proteins.

[47385] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3387 gene, herein designated VGAM GENE, on one or more VGAM3387 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[47386] It is yet further appreciated that a function of VGAM3387 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3387 include diagnosis, prevention and treatment of viral infection by Influenza A virus. Specific functions, and accordingly utilities, of VGAM3387 correlate with, and may be deduced from, the identity of the host target genes which VGAM3387 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47387] Nucleotide sequences of the VGAM3387 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3387 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3387 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3387 are further described hereinbelow with reference to Table 1.

[47388] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3387 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[47389] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3388 (VGAM3388) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47390] VGAM3388 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3388 was detected is described hereinabove with reference to Figs. 2–8.

[47391] VGAM3388 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 57. VGAM3388 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47392] VGAM3388 gene, herein designated VGAM GENE, encodes a VGAM3388 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3388 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3388 precursor RNA is designated SEQ ID:76049, and is provided hereinbelow with reference to the sequence listing part.

[47393] VGAM3388 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3388 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47394] An enzyme complex designated DICER COMPLEX, dices the VGAM3388 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3388 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3388 RNA is designated SEQ ID:76050,

and is provided hereinbelow with reference to the sequence listing part.

[47395] VGAM3388 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3388 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3388 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47396] VGAM3388 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3388 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3388 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3388 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3388 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47397] The complementary binding of VGAM3388 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3388 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3388 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3388 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47398] It is appreciated that VGAM3388 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3388 host target genes. The mRNA of each one of this plurality of VGAM3388 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3388 RNA, herein designated VGAM RNA, and which when bound by VGAM3388 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3388 host target proteins.

[47399] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3388 gene, herein designated VGAM GENE, on one or more VGAM3388 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47400] It is yet further appreciated that a function of VGAM3388 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3388 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 57. Specific functions, and accordingly utilities, of VGAM3388 correlate with, and may be deduced from, the identity of the host target genes which VGAM3388 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47401] Nucleotide sequences of the VGAM3388 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3388 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3388 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3388 are further described hereinbelow with reference to Table 1.

[47402] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3388 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47403] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3389 (VGAM3389) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47404] VGAM3389 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3389 was detected is described hereinabove with reference to Figs. 2–8.

[47405] VGAM3389 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 10. VGAM3389 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47406] VGAM3389 gene, herein designated VGAM GENE, encodes a VGAM3389 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3389 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3389 precu-

sor RNA is designated SEQ ID:76067, and is provided hereinbelow with reference to the sequence listing part.

[47407] VGAM3389 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3389 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47408] An enzyme complex designated DICER COMPLEX, dices the VGAM3389 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3389 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3389 RNA is designated SEQ ID:76068, and is provided hereinbelow with reference to the se-

quence listing part.

[47409] VGAM3389 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3389 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3389 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47410] VGAM3389 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3389 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3389 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3389 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3389 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47411] The complementary binding of VGAM3389 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3389 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3389 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3389 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47412] It is appreciated that VGAM3389 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3389 host target genes. The mRNA of each one of this plurality of VGAM3389 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3389 RNA, herein designated VGAM RNA, and which when bound by VGAM3389 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3389 host target proteins.

[47413] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3389 gene, herein designated VGAM GENE, on one or more VGAM3389 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47414] It is yet further appreciated that a function of VGAM3389

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3389 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 10. Specific functions, and accordingly utilities, of VGAM3389 correlate with, and may be deduced from, the identity of the host target genes which VGAM3389 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47415] Nucleotide sequences of the VGAM3389 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3389 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3389 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3389 are further described hereinbelow with reference to Table 1.

[47416] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3389 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47417] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3390 (VGAM3390) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47418] VGAM3390 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3390 was detected is described hereinabove with reference to Figs. 2–8.

[47419] VGAM3390 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Grapevine fanleaf virus. VGAM3390 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47420] VGAM3390 gene, herein designated VGAM GENE, encodes a VGAM3390 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3390 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3390 precursor RNA is designated SEQ ID:76113, and is provided

hereinbelow with reference to the sequence listing part.

[47421] VGAM3390 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3390 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47422] An enzyme complex designated DICER COMPLEX, dices the VGAM3390 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3390 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3390 RNA is designated SEQ ID:76114, and is provided hereinbelow with reference to the sequence listing part.

[47423] VGAM3390 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3390 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3390 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47424] VGAM3390 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3390 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3390 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3390 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3390 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47425] The complementary binding of VGAM3390 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3390 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3390 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3390 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47426] It is appreciated that VGAM3390 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3390 host target genes. The mRNA of each one of this plurality of VGAM3390 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3390 RNA, herein designated VGAM RNA, and which when bound by VGAM3390 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3390 host target proteins.

[47427] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3390 gene, herein designated VGAM GENE, on one or more VGAM3390 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47428] It is yet further appreciated that a function of VGAM3390 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3390 include diagnosis, prevention and treatment of viral infection by Grapevine fanleaf virus. Specific functions, and accordingly utilities, of VGAM3390 correlate with, and may be deduced from, the identity of the host target genes which VGAM3390 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47429] Nucleotide sequences of the VGAM3390 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3390 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3390 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3390 are further described hereinbelow with reference to Table 1.

[47430] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3390 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47431] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3391 (VGAM3391) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47432] VGAM3391 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3391 was detected is described hereinabove with reference to Figs. 2–8.

[47433] VGAM3391 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bean common mosaic necrosis virus. VGAM3391 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47434] VGAM3391 gene, herein designated VGAM GENE, encodes a VGAM3391 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3391 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3391 precursor RNA is designated SEQ ID:76132, and is provided hereinbelow with reference to the sequence listing part.

[47435] VGAM3391 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3391 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47436] An enzyme complex designated DICER COMPLEX, dices the VGAM3391 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3391 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3391 RNA is designated SEQ ID:76133, and is provided hereinbelow with reference to the sequence listing part.

[47437] VGAM3391 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3391 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3391 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47438] VGAM3391 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3391 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3391 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3391 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3391 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47439] The complementary binding of VGAM3391 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3391 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3391 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3391 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47440] It is appreciated that VGAM3391 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3391 host target genes. The mRNA of each one of this plurality of VGAM3391 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3391 RNA, herein designated VGAM

RNA, and which when bound by VGAM3391 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3391 host target proteins.

[47441] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3391 gene, herein designated VGAM GENE, on one or more VGAM3391 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47442] It is yet further appreciated that a function of VGAM3391 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3391 include diagnosis, prevention and treatment of viral infection by Bean common mosaic necrosis virus. Specific functions, and accordingly utilities, of VGAM3391 correlate with, and may be deduced from, the identity of the host target genes which VGAM3391 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47443] Nucleotide sequences of the VGAM3391 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3391 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3391 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3391 are further described hereinbelow with reference to Table 1.

[47444] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3391 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47445] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3392 (VGAM3392) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47446] VGAM3392 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3392 was detected is described hereinabove with reference to Figs. 2-8.

[47447] VGAM3392 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bean common mosaic necrosis virus. VGAM3392 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47448] VGAM3392 gene, herein designated VGAM GENE, encodes a VGAM3392 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3392 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3392 precursor RNA is designated SEQ ID:76139, and is provided hereinbelow with reference to the sequence listing part.

[47449] VGAM3392 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3392 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47450] An enzyme complex designated DICER COMPLEX, dices the VGAM3392 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3392 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3392 RNA is designated SEQ ID:76140, and is provided hereinbelow with reference to the sequence listing part.

[47451] VGAM3392 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3392 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3392 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47452] VGAM3392 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3392 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3392 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3392 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3392 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47453] The complementary binding of VGAM3392 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3392 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3392 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3392 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47454] It is appreciated that VGAM3392 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3392 host target genes. The mRNA of each one of this plurality of VGAM3392 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3392 RNA, herein designated VGAM RNA, and which when bound by VGAM3392 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3392 host target proteins.

[47455] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3392 gene, herein designated VGAM GENE, on one or more VGAM3392 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47456] It is yet further appreciated that a function of VGAM3392 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3392 include diagnosis, prevention and

treatment of viral infection by Bean common mosaic necrosis virus. Specific functions, and accordingly utilities, of VGAM3392 correlate with, and may be deduced from, the identity of the host target genes which VGAM3392 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47457] Nucleotide sequences of the VGAM3392 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3392 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3392 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3392 are further described hereinbelow with reference to Table 1.

[47458] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3392 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47459] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3393 (VGAM3393) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47460] VGAM3393 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3393 was detected is described hereinabove with reference to Figs. 2–8.

[47461] VGAM3393 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ovine adenovirus A. VGAM3393 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47462] VGAM3393 gene, herein designated VGAM GENE, encodes a VGAM3393 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3393 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3393 precursor RNA is designated SEQ ID:76144, and is provided hereinbelow with reference to the sequence listing part.

[47463] VGAM3393 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3393 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47464] An enzyme complex designated DICER COMPLEX, dices the VGAM3393 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3393 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3393 RNA is designated SEQ ID:76145, and is provided hereinbelow with reference to the sequence listing part.

[47465] VGAM3393 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3393 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3393 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47466] VGAM3393 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3393 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3393 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3393 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3393 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47467] The complementary binding of VGAM3393 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3393 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3393 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3393 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47468] It is appreciated that VGAM3393 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3393 host target genes. The mRNA of each one of this plurality of VGAM3393 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3393 RNA, herein designated VGAM RNA, and which when bound by VGAM3393 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3393 host target proteins.

[47469] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3393 gene, herein designated VGAM GENE, on one or more VGAM3393 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47470] It is yet further appreciated that a function of VGAM3393 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3393 include diagnosis, prevention and treatment of viral infection by Ovine adenovirus A. Specific

functions, and accordingly utilities, of VGAM3393 correlate with, and may be deduced from, the identity of the host target genes which VGAM3393 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47471] Nucleotide sequences of the VGAM3393 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3393 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3393 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3393 are further described hereinbelow with reference to Table 1.

[47472] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3393 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47473] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3394 (VGAM3394) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[47474] VGAM3394 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3394 was detected is described hereinabove with reference to Figs. 2–8.

[47475] VGAM3394 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious spleen and kidney necrosis virus. VGAM3394 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47476] VGAM3394 gene, herein designated VGAM GENE, encodes a VGAM3394 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3394 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3394 precursor RNA is designated SEQ ID:76150, and is provided hereinbelow with reference to the sequence listing part.

[47477] VGAM3394 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3394 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47478] An enzyme complex designated DICER COMPLEX, dices the VGAM3394 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3394 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3394 RNA is designated SEQ ID:76151, and is provided hereinbelow with reference to the sequence listing part.

[47479] VGAM3394 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3394 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3394 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47480] VGAM3394 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3394 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3394 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3394 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3394 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47481] The complementary binding of VGAM3394 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3394 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3394 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3394 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47482] It is appreciated that VGAM3394 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3394 host target genes. The mRNA of each one of this plurality of VGAM3394 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3394 RNA, herein designated VGAM RNA, and which when bound by VGAM3394 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3394 host target proteins.

[47483] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3394 gene, herein designated VGAM GENE, on one or more VGAM3394 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47484] It is yet further appreciated that a function of VGAM3394 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3394 include diagnosis, prevention and treatment of viral infection by Infectious spleen and kidney necrosis virus. Specific functions, and accordingly

utilities, of VGAM3394 correlate with, and may be deduced from, the identity of the host target genes which VGAM3394 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47485] Nucleotide sequences of the VGAM3394 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3394 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3394 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3394 are further described hereinbelow with reference to Table 1.

[47486] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3394 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47487] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3395 (VGAM3395) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[47488] VGAM3395 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3395 was detected is described hereinabove with reference to Figs. 2–8.

[47489] VGAM3395 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3395 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47490] VGAM3395 gene, herein designated VGAM GENE, encodes a VGAM3395 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3395 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3395 precursor RNA is designated SEQ ID:76159, and is provided hereinbelow with reference to the sequence listing part.

[47491] VGAM3395 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3395 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47492] An enzyme complex designated DICER COMPLEX, dices the VGAM3395 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3395 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3395 RNA is designated SEQ ID:76160, and is provided hereinbelow with reference to the sequence listing part.

[47493] VGAM3395 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3395 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3395 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47494] VGAM3395 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3395 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3395 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3395 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3395 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47495] The complementary binding of VGAM3395 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3395 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3395 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3395 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47496] It is appreciated that VGAM3395 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3395 host target genes. The mRNA of each one of this plurality of VGAM3395 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3395 RNA, herein designated VGAM RNA, and which when bound by VGAM3395 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3395 host target proteins.

[47497] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3395 gene, herein designated VGAM GENE, on one or more VGAM3395 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47498] It is yet further appreciated that a function of VGAM3395 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3395 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3395 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3395 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47499] Nucleotide sequences of the VGAM3395 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3395 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3395 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3395 are further described hereinbelow with reference to Table 1.

[47500] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3395 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47501] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3396 (VGAM3396) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47502] VGAM3396 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3396 was detected is described hereinabove with reference to Figs. 2–8.

[47503] VGAM3396 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3396 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47504] VGAM3396 gene, herein designated VGAM GENE, encodes a VGAM3396 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3396 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3396 precursor RNA is designated SEQ ID:76192, and is provided hereinbelow with reference to the sequence listing part.

[47505] VGAM3396 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3396 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47506] An enzyme complex designated DICER COMPLEX, dices the VGAM3396 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3396 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3396 RNA is designated SEQ ID:76193, and is provided hereinbelow with reference to the sequence listing part.

[47507] VGAM3396 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3396 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3396 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47508] VGAM3396 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3396 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3396 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3396 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3396 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47509] The complementary binding of VGAM3396 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3396 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3396 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3396 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47510] It is appreciated that VGAM3396 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3396 host target genes. The mRNA of each one of this plurality of VGAM3396 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3396 RNA, herein designated VGAM RNA, and which when bound by VGAM3396 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3396 host target proteins.

[47511] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3396 gene, herein designated VGAM GENE, on one or more VGAM3396 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47512] It is yet further appreciated that a function of VGAM3396 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3396 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3396 correlate with, and may be deduced from, the identity of the host target genes which

VGAM3396 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47513] Nucleotide sequences of the VGAM3396 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3396 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3396 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3396 are further described hereinbelow with reference to Table 1.

[47514] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3396 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47515] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3397 (VGAM3397) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47516] VGAM3397 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3397 was detected is described hereinabove with reference to Figs. 2–8.

[47517] VGAM3397 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3397 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47518] VGAM3397 gene, herein designated VGAM GENE, encodes a VGAM3397 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3397 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3397 precursor RNA is designated SEQ ID:76212, and is provided hereinbelow with reference to the sequence listing part.

[47519] VGAM3397 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3397 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47520] An enzyme complex designated DICER COMPLEX, dices the VGAM3397 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3397 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3397 RNA is designated SEQ ID:76213, and is provided hereinbelow with reference to the sequence listing part.

[47521] VGAM3397 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3397 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3397 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47522] VGAM3397 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3397 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3397 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3397 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3397 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[47523] The complementary binding of VGAM3397 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3397 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3397 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3397 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47524] It is appreciated that VGAM3397 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3397 host target genes. The mRNA of each one of this plurality of VGAM3397 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3397 RNA, herein designated VGAM RNA, and which when bound by VGAM3397 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3397 host target proteins.

[47525] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3397 gene, herein designated VGAM GENE, on one or more VGAM3397 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47526] It is yet further appreciated that a function of VGAM3397 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3397 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3397 correlate with, and may be deduced from, the identity of the host target genes which VGAM3397 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[47527] Nucleotide sequences of the VGAM3397 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3397 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3397 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3397 are further described hereinbelow with reference to Table 1.

[47528] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3397 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47529] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3398 (VGAM3398) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47530] VGAM3398 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3398 was detected is described hereinabove with reference to Figs. 2–8.

[47531] VGAM3398 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3398 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47532] VGAM3398 gene, herein designated VGAM GENE, encodes a VGAM3398 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3398 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3398 precursor RNA is designated SEQ ID:76288, and is provided hereinbelow with reference to the sequence listing part.

[47533] VGAM3398 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3398 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47534] An enzyme complex designated DICER COMPLEX, dices the VGAM3398 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3398 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3398 RNA is designated SEQ ID:76289, and is provided hereinbelow with reference to the sequence listing part.

[47535] VGAM3398 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3398 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3398 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[47536] VGAM3398 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3398 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3398 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3398 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3398 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47537] The complementary binding of VGAM3398 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3398 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3398 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3398 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47538] It is appreciated that VGAM3398 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3398 host target genes. The mRNA of each one of this plurality of VGAM3398 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3398 RNA, herein designated VGAM RNA, and which when bound by VGAM3398 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3398 host target proteins.

[47539] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3398 gene, herein designated VGAM GENE, on one

or more VGAM3398 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47540] It is yet further appreciated that a function of VGAM3398 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3398 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3398 correlate with, and may be deduced from, the identity of the host target genes which VGAM3398 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47541] Nucleotide sequences of the VGAM3398 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3398 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3398 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3398 are further described hereinbelow with reference to Table 1.

[47542] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3398 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47543] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3399 (VGAM3399) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47544] VGAM3399 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3399 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[47545] VGAM3399 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 50. VGAM3399 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47546] VGAM3399 gene, herein designated VGAM GENE, encodes a VGAM3399 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3399 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3399 precursor RNA is designated SEQ ID:76351, and is provided hereinbelow with reference to the sequence listing part.

[47547] VGAM3399 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3399 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47548] An enzyme complex designated DICER COMPLEX, dices the VGAM3399 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3399 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3399 RNA is designated SEQ ID:76352, and is provided hereinbelow with reference to the sequence listing part.

[47549] VGAM3399 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3399 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3399 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47550] VGAM3399 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3399 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3399 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3399 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3399 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47551] The complementary binding of VGAM3399 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3399 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3399 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3399 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47552] It is appreciated that VGAM3399 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3399 host target genes. The mRNA of each one of this plurality of VGAM3399 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3399 RNA, herein designated VGAM RNA, and which when bound by VGAM3399 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3399 host target proteins.

[47553] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3399 gene, herein designated VGAM GENE, on one or more VGAM3399 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47554] It is yet further appreciated that a function of VGAM3399 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3399 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 50. Specific functions, and accordingly utilities, of VGAM3399 correlate with, and may be deduced from, the identity of the host target genes which VGAM3399 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47555] Nucleotide sequences of the VGAM3399 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3399 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3399 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3399 are further described hereinbelow with reference to Table 1.

[47556] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3399 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47557] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3400 (VGAM3400) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47558] VGAM3400 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3400 was detected is described hereinabove with reference to Figs. 2-8.

[47559] VGAM3400 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Frog adenovirus 1.

VGAM3400 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47560] VGAM3400 gene, herein designated VGAM GENE, encodes a VGAM3400 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3400 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3400 precursor RNA is designated SEQ ID:76511, and is provided hereinbelow with reference to the sequence listing part.

[47561] VGAM3400 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3400 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[47562] An enzyme complex designated DICER COMPLEX, dices the VGAM3400 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3400 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3400 RNA is designated SEQ ID:76512, and is provided hereinbelow with reference to the sequence listing part.

[47563] VGAM3400 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3400 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3400 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47564] VGAM3400 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3400 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3400 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3400 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3400 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47565] The complementary binding of VGAM3400 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3400 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3400 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3400 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47566] It is appreciated that VGAM3400 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3400 host target genes. The mRNA of each one of this plurality of VGAM3400 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3400 RNA, herein designated VGAM RNA, and which when bound by VGAM3400 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3400 host target proteins.

[47567] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3400 gene, herein designated VGAM GENE, on one or more VGAM3400 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47568] It is yet further appreciated that a function of VGAM3400 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3400 include diagnosis, prevention and treatment of viral infection by Frog adenovirus 1. Specific functions, and accordingly utilities, of VGAM3400 correlate with, and may be deduced from, the identity of the host target genes which VGAM3400 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47569] Nucleotide sequences of the VGAM3400 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3400 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3400 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3400 are further described hereinbelow with reference to Table 1.

[47570] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3400 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47571] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3401 (VGAM3401) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47572] VGAM3401 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3401 was detected is described hereinabove with reference to Figs. 2-8.

[47573] VGAM3401 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Fowlpox virus.

VGAM3401 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47574] VGAM3401 gene, herein designated VGAM GENE, encodes a VGAM3401 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3401 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3401 precursor RNA is designated SEQ ID:76515, and is provided hereinbelow with reference to the sequence listing part.

[47575] VGAM3401 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3401 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47576] An enzyme complex designated DICER COMPLEX, dices the VGAM3401 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3401 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3401 RNA is designated SEQ ID:76516, and is provided hereinbelow with reference to the sequence listing part.

[47577] VGAM3401 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3401 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3401 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47578] VGAM3401 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3401 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3401 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3401 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3401 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47579] The complementary binding of VGAM3401 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3401 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3401 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3401 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47580] It is appreciated that VGAM3401 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3401 host target genes. The mRNA of each one of this plurality of VGAM3401 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3401 RNA, herein designated VGAM RNA, and which when bound by VGAM3401 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3401 host target proteins.

[47581] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3401 gene, herein designated VGAM GENE, on one or more VGAM3401 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47582] It is yet further appreciated that a function of VGAM3401 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3401 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3401 correlate with, and may be deduced from, the identity of the host target genes which VGAM3401 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47583] Nucleotide sequences of the VGAM3401 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3401 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3401 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3401 are further described hereinbelow with reference to Table 1.

[47584] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3401 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47585] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3402 (VGAM3402) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47586] VGAM3402 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3402 was detected is described hereinabove with reference to Figs. 2-8.

[47587] VGAM3402 gene, herein designated VGAM GENE, is a viral gene contained in the genome of *Macaca mulatta* rhadi-

novirus. VGAM3402 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47588] VGAM3402 gene, herein designated VGAM GENE, encodes a VGAM3402 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3402 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3402 precursor RNA is designated SEQ ID:76521, and is provided hereinbelow with reference to the sequence listing part.

[47589] VGAM3402 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3402 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47590] An enzyme complex designated DICER COMPLEX, dices

the VGAM3402 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3402 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3402 RNA is designated SEQ ID:76522, and is provided hereinbelow with reference to the sequence listing part.

[47591] VGAM3402 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3402 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3402 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47592] VGAM3402 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3402 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3402 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3402 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3402 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47593] The complementary binding of VGAM3402 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3402 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3402 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3402 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47594] It is appreciated that VGAM3402 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3402 host target genes. The mRNA of each one of this plurality of VGAM3402 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3402 RNA, herein designated VGAM RNA, and which when bound by VGAM3402 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3402 host target proteins.

[47595] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3402 gene, herein designated VGAM GENE, on one or more VGAM3402 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47596] It is yet further appreciated that a function of VGAM3402 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3402 include diagnosis, prevention and treatment of viral infection by *Macaca mulatta* rhadinovirus. Specific functions, and accordingly utilities, of VGAM3402 correlate with, and may be deduced from, the identity of the host target genes which VGAM3402 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47597] Nucleotide sequences of the VGAM3402 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3402 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3402 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3402 are further described hereinbelow with reference to Table 1.

[47598] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3402 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47599] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3403 (VGAM3403) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47600] VGAM3403 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3403 was detected is described hereinabove with reference to Figs. 2-8.

[47601] VGAM3403 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3403 host target gene, herein

designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47602] VGAM3403 gene, herein designated VGAM GENE, encodes a VGAM3403 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3403 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3403 precursor RNA is designated SEQ ID:76529, and is provided hereinbelow with reference to the sequence listing part.

[47603] VGAM3403 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3403 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47604] An enzyme complex designated DICER COMPLEX, dices the VGAM3403 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3403 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3403 RNA is designated SEQ ID:76530, and is provided hereinbelow with reference to the sequence listing part.

[47605] VGAM3403 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3403 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3403 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47606] VGAM3403 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3403 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3403 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3403 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3403 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47607] The complementary binding of VGAM3403 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3403 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3403

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3403 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47608] It is appreciated that VGAM3403 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3403 host target genes. The mRNA of each one of this plurality of VGAM3403 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3403 RNA, herein designated VGAM RNA, and which when bound by VGAM3403 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3403 host target proteins.

[47609] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3403 gene, herein designated VGAM GENE, on one or more VGAM3403 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47610] It is yet further appreciated that a function of VGAM3403 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3403 include diagnosis, prevention and treatment of viral infection by Melanoplus sanguinipes entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3403 correlate with, and may be deduced from, the identity of the host target genes which VGAM3403 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47611] Nucleotide sequences of the VGAM3403 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3403 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3403 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3403 are further described hereinbelow with reference to Table 1.

[47612] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3403 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47613] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3404 (VGAM3404) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47614] VGAM3404 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3404 was detected is described hereinabove with reference to Figs. 2-8.

[47615] VGAM3404 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 48. VGAM3404 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[47616] VGAM3404 gene, herein designated VGAM GENE, encodes a VGAM3404 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3404 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3404 precursor RNA is designated SEQ ID:76539, and is provided hereinbelow with reference to the sequence listing part.

[47617] VGAM3404 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3404 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47618] An enzyme complex designated DICER COMPLEX, dices the VGAM3404 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3404 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3404 RNA is designated SEQ ID:76540, and is provided hereinbelow with reference to the sequence listing part.

[47619] VGAM3404 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3404 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3404 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47620] VGAM3404 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3404 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3404 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3404 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3404 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47621] The complementary binding of VGAM3404 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3404 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3404 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3404 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47622] It is appreciated that VGAM3404 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3404 host target genes. The mRNA of each one of this plurality of VGAM3404 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3404 RNA, herein designated VGAM RNA, and which when bound by VGAM3404 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3404 host target proteins.

[47623] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3404 gene, herein designated VGAM GENE, on one or more VGAM3404 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47624] It is yet further appreciated that a function of VGAM3404 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3404 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 48. Specific functions, and accordingly utilities, of VGAM3404 correlate with, and may be deduced from, the identity of the host target genes which VGAM3404 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47625] Nucleotide sequences of the VGAM3404 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3404 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3404 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3404 are further

described hereinbelow with reference to Table 1.

[47626] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3404 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47627] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3405 (VGAM3405) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47628] VGAM3405 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3405 was detected is described hereinabove with reference to Figs. 2-8.

[47629] VGAM3405 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2. VGAM3405 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47630] VGAM3405 gene, herein designated VGAM GENE, encodes a VGAM3405 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3405 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3405 precursor RNA is designated SEQ ID:76551, and is provided hereinbelow with reference to the sequence listing part.

[47631] VGAM3405 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3405 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47632] An enzyme complex designated DICER COMPLEX, dices the VGAM3405 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3405 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3405 RNA is designated SEQ ID:76552, and is provided hereinbelow with reference to the sequence listing part.

[47633] VGAM3405 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3405 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3405 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47634] VGAM3405 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3405 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3405 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3405 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3405 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47635] The complementary binding of VGAM3405 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3405 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3405 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3405 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47636] It is appreciated that VGAM3405 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3405 host target genes. The mRNA of each one of this plurality of VGAM3405 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3405 RNA, herein designated VGAM RNA, and which when bound by VGAM3405 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3405 host target proteins.

[47637] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3405 gene, herein designated VGAM GENE, on one or more VGAM3405 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47638] It is yet further appreciated that a function of VGAM3405 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3405 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3405 correlate with, and may be deduced from, the identity of the host target genes which VGAM3405 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47639] Nucleotide sequences of the VGAM3405 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3405 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3405 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3405 are further described hereinbelow with reference to Table 1.

[47640] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3405 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47641] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3406 (VGAM3406) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47642] VGAM3406 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3406 was detected is described hereinabove with reference to Figs. 2-8.

[47643] VGAM3406 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3. VGAM3406 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47644] VGAM3406 gene, herein designated VGAM GENE, encodes

a VGAM3406 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3406 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3406 precursor RNA is designated SEQ ID:76555, and is provided hereinbelow with reference to the sequence listing part.

[47645] VGAM3406 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3406 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47646] An enzyme complex designated DICER COMPLEX, dices the VGAM3406 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3406 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3406 RNA is designated SEQ ID:76556, and is provided hereinbelow with reference to the sequence listing part.

[47647] VGAM3406 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3406 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3406 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47648] VGAM3406 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3406 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3406 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3406 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3406 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47649] The complementary binding of VGAM3406 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3406 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3406 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3406 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[47650] It is appreciated that VGAM3406 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3406 host target genes. The mRNA of each one of this plurality of VGAM3406 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3406 RNA, herein designated VGAM RNA, and which when bound by VGAM3406 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3406 host target proteins.

[47651] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3406 gene, herein designated VGAM GENE, on one or more VGAM3406 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47652] It is yet further appreciated that a function of VGAM3406 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3406 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3406 correlate with, and may be deduced from, the identity of the host target genes which VGAM3406 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47653] Nucleotide sequences of the VGAM3406 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3406 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3406 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3406 are further described hereinbelow with reference to Table 1.

[47654] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3406 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47655] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3407 (VGAM3407) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47656] VGAM3407 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3407 was detected is described hereinabove with reference to Figs. 2-8.

[47657] VGAM3407 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Acute bee paralysis virus. VGAM3407 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47658] VGAM3407 gene, herein designated VGAM GENE, encodes a VGAM3407 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3407 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3407 precursor RNA is designated SEQ ID:76569, and is provided hereinbelow with reference to the sequence listing part.

[47659] VGAM3407 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3407 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47660] An enzyme complex designated DICER COMPLEX, dices the VGAM3407 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3407 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3407 RNA is designated SEQ ID:76570, and is provided hereinbelow with reference to the sequence listing part.

[47661] VGAM3407 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3407 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3407 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47662] VGAM3407 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3407 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3407 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3407 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3407 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47663] The complementary binding of VGAM3407 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3407 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3407 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3407 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47664] It is appreciated that VGAM3407 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3407 host target genes. The mRNA of each one of this plurality of VGAM3407 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3407 RNA, herein designated VGAM RNA, and which when bound by VGAM3407 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3407 host target proteins.

[47665] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3407 gene, herein designated VGAM GENE, on one or more VGAM3407 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47666] It is yet further appreciated that a function of VGAM3407 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3407 include diagnosis, prevention and treatment of viral infection by Acute bee paralysis virus. Specific functions, and accordingly utilities, of VGAM3407 correlate with, and may be deduced from, the identity of the host target genes which VGAM3407 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47667] Nucleotide sequences of the VGAM3407 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3407 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3407 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3407 are further described hereinbelow with reference to Table 1.

[47668] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3407 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47669] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3408 (VGAM3408) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47670] VGAM3408 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3408 was detected is described hereinabove with reference to Figs. 2-8.

[47671] VGAM3408 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine respiratory syncytial virus. VGAM3408 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47672] VGAM3408 gene, herein designated VGAM GENE, encodes a VGAM3408 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3408 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3408 precursor RNA is designated SEQ ID:76574, and is provided hereinbelow with reference to the sequence listing part.

[47673] VGAM3408 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3408 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47674] An enzyme complex designated DICER COMPLEX, dices the VGAM3408 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3408 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3408 RNA is designated SEQ ID:76575, and is provided hereinbelow with reference to the sequence listing part.

[47675] VGAM3408 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3408 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3408 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47676] VGAM3408 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3408 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3408 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3408 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3408 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47677] The complementary binding of VGAM3408 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3408 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3408 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3408 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47678] It is appreciated that VGAM3408 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3408 host target genes. The mRNA of each one of this plurality of VGAM3408 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3408 RNA, herein designated VGAM RNA, and which when bound by VGAM3408 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3408 host target proteins.

[47679] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3408 gene, herein designated VGAM GENE, on one or more VGAM3408 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G.,
Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[47680] It is yet further appreciated that a function of VGAM3408 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3408 include diagnosis, prevention and treatment of viral infection by Bovine respiratory syncytial virus. Specific functions, and accordingly utilities, of VGAM3408 correlate with, and may be deduced from, the identity of the host target genes which VGAM3408 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47681] Nucleotide sequences of the VGAM3408 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3408 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3408 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3408 are further described hereinbelow with reference to Table 1.

[47682] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3408 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47683] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3409 (VGAM3409) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47684] VGAM3409 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3409 was detected is described hereinabove with reference to Figs. 2–8.

[47685] VGAM3409 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 4. VGAM3409 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47686] VGAM3409 gene, herein designated VGAM GENE, encodes a VGAM3409 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3409 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3409 precursor RNA is designated SEQ ID:76581, and is provided hereinbelow with reference to the sequence listing part.

[47687] VGAM3409 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3409 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47688] An enzyme complex designated DICER COMPLEX, dices the VGAM3409 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3409 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3409 RNA is designated SEQ ID:76582, and is provided hereinbelow with reference to the sequence listing part.

[47689] VGAM3409 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3409 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3409 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47690] VGAM3409 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3409 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3409 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3409 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3409 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47691] The complementary binding of VGAM3409 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3409 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3409 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3409 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47692] It is appreciated that VGAM3409 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3409 host target genes. The mRNA of each one of this plurality of VGAM3409 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3409 RNA, herein designated VGAM RNA, and which when bound by VGAM3409 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3409 host target proteins.

[47693] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3409 gene, herein designated VGAM GENE, on one or more VGAM3409 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [47694] It is yet further appreciated that a function of VGAM3409 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3409 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3409 correlate with, and may be deduced from, the identity of the host target genes which VGAM3409 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [47695] Nucleotide sequences of the VGAM3409 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3409 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3409 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3409 are further described hereinbelow with reference to Table 1.
- [47696] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3409 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47697] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3410 (VGAM3410) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47698] VGAM3410 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3410 was detected is described hereinabove with reference to Figs. 2–8.

[47699] VGAM3410 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Barley yellow dwarf virus – MAV. VGAM3410 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47700] VGAM3410 gene, herein designated VGAM GENE, encodes a VGAM3410 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3410 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3410 precursor RNA is designated SEQ ID:76833, and is provided hereinbelow with reference to the sequence listing part.

[47701] VGAM3410 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3410 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47702] An enzyme complex designated DICER COMPLEX, dices the VGAM3410 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3410 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3410 RNA is designated SEQ ID:76834, and is provided hereinbelow with reference to the sequence listing part.

[47703] VGAM3410 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3410 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3410 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47704] VGAM3410 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3410 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3410 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3410 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3410 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47705] The complementary binding of VGAM3410 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3410 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3410 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3410 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47706] It is appreciated that VGAM3410 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3410 host target genes. The mRNA of

each one of this plurality of VGAM3410 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3410 RNA, herein designated VGAM RNA, and which when bound by VGAM3410 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3410 host target proteins.

[47707] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3410 gene, herein designated VGAM GENE, on one or more VGAM3410 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[47708] It is yet further appreciated that a function of VGAM3410 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3410 include diagnosis, prevention and treatment of viral infection by Barley yellow dwarf virus – MAV. Specific functions, and accordingly utilities, of VGAM3410 correlate with, and may be deduced from, the identity of the host target genes which VGAM3410 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47709] Nucleotide sequences of the VGAM3410 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3410 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3410 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3410 are further described hereinbelow with reference to Table 1.

[47710] Nucleotide sequences of host target binding sites, such as BINDING SITE–I, BINDING SITE–II and BINDING SITE–III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3410 RNA, herein designated VGAM RNA, are de–

scribed hereinbelow with reference to Table 2.

[47711] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3411 (VGAM3411) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47712] VGAM3411 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3411 was detected is described hereinabove with reference to Figs. 2–8.

[47713] VGAM3411 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious spleen and kidney necrosis virus. VGAM3411 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47714] VGAM3411 gene, herein designated VGAM GENE, encodes a VGAM3411 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3411 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3411 precursor RNA is designated SEQ ID:76874, and is provided hereinbelow with reference to the sequence listing part.

[47715] VGAM3411 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3411 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47716] An enzyme complex designated DICER COMPLEX, dices the VGAM3411 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3411 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3411 RNA is designated SEQ ID:76875,

and is provided hereinbelow with reference to the sequence listing part.

[47717] VGAM3411 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3411 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3411 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47718] VGAM3411 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3411 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3411 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3411 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3411 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47719] The complementary binding of VGAM3411 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3411 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3411 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3411 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47720] It is appreciated that VGAM3411 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3411 host target genes. The mRNA of each one of this plurality of VGAM3411 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3411 RNA, herein designated VGAM RNA, and which when bound by VGAM3411 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3411 host target proteins.

[47721] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3411 gene, herein designated VGAM GENE, on one or more VGAM3411 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47722] It is yet further appreciated that a function of VGAM3411 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3411 include diagnosis, prevention and treatment of viral infection by Infectious spleen and kidney necrosis virus. Specific functions, and accordingly utilities, of VGAM3411 correlate with, and may be deduced from, the identity of the host target genes which VGAM3411 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47723] Nucleotide sequences of the VGAM3411 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3411 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3411 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3411 are further described hereinbelow with reference to Table 1.

[47724] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3411 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47725] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3412 (VGAM3412) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47726] VGAM3412 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3412 was detected is described hereinabove with reference to Figs. 2–8.

[47727] VGAM3412 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Aichi virus. VGAM3412 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47728] VGAM3412 gene, herein designated VGAM GENE, encodes a VGAM3412 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3412 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3412 precursor RNA is designated SEQ ID:76903, and is provided

hereinbelow with reference to the sequence listing part.

[47729] VGAM3412 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3412 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47730] An enzyme complex designated DICER COMPLEX, dices the VGAM3412 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3412 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3412 RNA is designated SEQ ID:76904, and is provided hereinbelow with reference to the sequence listing part.

[47731] VGAM3412 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3412 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3412 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47732] VGAM3412 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3412 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3412 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3412 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3412 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47733] The complementary binding of VGAM3412 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3412 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3412 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3412 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47734] It is appreciated that VGAM3412 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3412 host target genes. The mRNA of each one of this plurality of VGAM3412 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3412 RNA, herein designated VGAM RNA, and which when bound by VGAM3412 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3412 host target proteins.

[47735] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3412 gene, herein designated VGAM GENE, on one or more VGAM3412 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47736] It is yet further appreciated that a function of VGAM3412 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3412 include diagnosis, prevention and treatment of viral infection by Aichi virus. Specific functions, and accordingly utilities, of VGAM3412 correlate with, and may be deduced from, the identity of the host target genes which VGAM3412 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47737] Nucleotide sequences of the VGAM3412 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3412 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3412 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3412 are further described hereinbelow with reference to Table 1.

[47738] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3412 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47739] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3413 (VGAM3413) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47740] VGAM3413 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3413 was detected is described hereinabove with reference to Figs. 2–8.

[47741] VGAM3413 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 7. VGAM3413 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47742] VGAM3413 gene, herein designated VGAM GENE, encodes a VGAM3413 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3413 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3413 precursor RNA is designated SEQ ID:76935, and is provided hereinbelow with reference to the sequence listing part.

[47743] VGAM3413 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3413 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47744] An enzyme complex designated DICER COMPLEX, dices the VGAM3413 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3413 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3413 RNA is designated SEQ ID:76936, and is provided hereinbelow with reference to the sequence listing part.

[47745] VGAM3413 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3413 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3413 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47746] VGAM3413 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3413 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3413 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3413 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3413 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47747] The complementary binding of VGAM3413 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3413 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3413 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3413 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47748] It is appreciated that VGAM3413 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3413 host target genes. The mRNA of each one of this plurality of VGAM3413 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3413 RNA, herein designated VGAM

RNA, and which when bound by VGAM3413 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3413 host target proteins.

[47749] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3413 gene, herein designated VGAM GENE, on one or more VGAM3413 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47750] It is yet further appreciated that a function of VGAM3413 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3413 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3413 correlate with, and may be deduced from, the identity of the host target genes which VGAM3413 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47751] Nucleotide sequences of the VGAM3413 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3413 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3413 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3413 are further described hereinbelow with reference to Table 1.

[47752] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3413 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47753] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3414 (VGAM3414) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47754] VGAM3414 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3414 was detected is described hereinabove with reference to Figs. 2-8.

[47755] VGAM3414 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious flacherie virus. VGAM3414 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47756] VGAM3414 gene, herein designated VGAM GENE, encodes a VGAM3414 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3414 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3414 precursor RNA is designated SEQ ID:76940, and is provided hereinbelow with reference to the sequence listing part.

[47757] VGAM3414 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3414 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47758] An enzyme complex designated DICER COMPLEX, dices the VGAM3414 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3414 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3414 RNA is designated SEQ ID:76941, and is provided hereinbelow with reference to the sequence listing part.

[47759] VGAM3414 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3414 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3414 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47760] VGAM3414 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3414 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3414 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3414 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3414 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47761] The complementary binding of VGAM3414 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3414 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3414 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3414 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47762] It is appreciated that VGAM3414 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3414 host target genes. The mRNA of each one of this plurality of VGAM3414 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3414 RNA, herein designated VGAM RNA, and which when bound by VGAM3414 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3414 host target proteins.

[47763] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3414 gene, herein designated VGAM GENE, on one or more VGAM3414 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47764] It is yet further appreciated that a function of VGAM3414 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3414 include diagnosis, prevention and

treatment of viral infection by Infectious flacherie virus. Specific functions, and accordingly utilities, of VGAM3414 correlate with, and may be deduced from, the identity of the host target genes which VGAM3414 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47765] Nucleotide sequences of the VGAM3414 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3414 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3414 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3414 are further described hereinbelow with reference to Table 1.

[47766] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3414 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47767] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3415 (VGAM3415) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47768] VGAM3415 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3415 was detected is described hereinabove with reference to Figs. 2–8.

[47769] VGAM3415 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious flacherie virus. VGAM3415 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47770] VGAM3415 gene, herein designated VGAM GENE, encodes a VGAM3415 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3415 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3415 precursor RNA is designated SEQ ID:76946, and is provided hereinbelow with reference to the sequence listing part.

[47771] VGAM3415 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3415 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47772] An enzyme complex designated DICER COMPLEX, dices the VGAM3415 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3415 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3415 RNA is designated SEQ ID:76947, and is provided hereinbelow with reference to the sequence listing part.

[47773] VGAM3415 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3415 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3415 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47774] VGAM3415 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3415 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3415 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3415 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3415 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47775] The complementary binding of VGAM3415 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3415 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3415 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3415 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47776] It is appreciated that VGAM3415 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3415 host target genes. The mRNA of each one of this plurality of VGAM3415 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3415 RNA, herein designated VGAM RNA, and which when bound by VGAM3415 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3415 host target proteins.

[47777] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3415 gene, herein designated VGAM GENE, on one or more VGAM3415 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47778] It is yet further appreciated that a function of VGAM3415 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3415 include diagnosis, prevention and treatment of viral infection by Infectious flacherie virus.

Specific functions, and accordingly utilities, of VGAM3415 correlate with, and may be deduced from, the identity of the host target genes which VGAM3415 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47779] Nucleotide sequences of the VGAM3415 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3415 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3415 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3415 are further described hereinbelow with reference to Table 1.

[47780] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3415 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47781] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3416 (VGAM3416) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[47782] VGAM3416 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3416 was detected is described hereinabove with reference to Figs. 2–8.

[47783] VGAM3416 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious flacherie virus. VGAM3416 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47784] VGAM3416 gene, herein designated VGAM GENE, encodes a VGAM3416 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3416 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3416 precursor RNA is designated SEQ ID:76958, and is provided hereinbelow with reference to the sequence listing part.

[47785] VGAM3416 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3416 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47786] An enzyme complex designated DICER COMPLEX, dices the VGAM3416 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3416 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3416 RNA is designated SEQ ID:76959, and is provided hereinbelow with reference to the sequence listing part.

[47787] VGAM3416 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3416 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3416 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47788] VGAM3416 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3416 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3416 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3416 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3416 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47789] The complementary binding of VGAM3416 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3416 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3416 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3416 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47790] It is appreciated that VGAM3416 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3416 host target genes. The mRNA of each one of this plurality of VGAM3416 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3416 RNA, herein designated VGAM RNA, and which when bound by VGAM3416 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3416 host target proteins.

[47791] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3416 gene, herein designated VGAM GENE, on one or more VGAM3416 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47792] It is yet further appreciated that a function of VGAM3416 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3416 include diagnosis, prevention and treatment of viral infection by Infectious flacherie virus. Specific functions, and accordingly utilities, of VGAM3416

correlate with, and may be deduced from, the identity of the host target genes which VGAM3416 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47793] Nucleotide sequences of the VGAM3416 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3416 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3416 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3416 are further described hereinbelow with reference to Table 1.

[47794] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3416 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47795] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3417 (VGAM3417) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[47796] VGAM3417 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3417 was detected is described hereinabove with reference to Figs. 2–8.

[47797] VGAM3417 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 3. VGAM3417 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47798] VGAM3417 gene, herein designated VGAM GENE, encodes a VGAM3417 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3417 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3417 precursor RNA is designated SEQ ID:76984, and is provided hereinbelow with reference to the sequence listing part.

[47799] VGAM3417 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3417 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47800] An enzyme complex designated DICER COMPLEX, dices the VGAM3417 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3417 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3417 RNA is designated SEQ ID:76985, and is provided hereinbelow with reference to the sequence listing part.

[47801] VGAM3417 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3417 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3417 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47802] VGAM3417 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3417 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3417 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3417 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3417 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47803] The complementary binding of VGAM3417 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3417 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3417 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3417 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47804] It is appreciated that VGAM3417 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3417 host target genes. The mRNA of each one of this plurality of VGAM3417 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3417 RNA, herein designated VGAM RNA, and which when bound by VGAM3417 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3417 host target proteins.

[47805] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3417 gene, herein designated VGAM GENE, on one or more VGAM3417 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47806] It is yet further appreciated that a function of VGAM3417 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3417 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3417 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3417 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47807] Nucleotide sequences of the VGAM3417 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3417 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3417 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3417 are further described hereinbelow with reference to Table 1.

[47808] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3417 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47809] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3418 (VGAM3418) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47810] VGAM3418 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3418 was detected is described hereinabove with reference to Figs. 2–8.

[47811] VGAM3418 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 3. VGAM3418 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47812] VGAM3418 gene, herein designated VGAM GENE, encodes a VGAM3418 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3418 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3418 precursor RNA is designated SEQ ID:76987, and is provided hereinbelow with reference to the sequence listing part.

[47813] VGAM3418 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3418 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47814] An enzyme complex designated DICER COMPLEX, dices the VGAM3418 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3418 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3418 RNA is designated SEQ ID:76988, and is provided hereinbelow with reference to the sequence listing part.

[47815] VGAM3418 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3418 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3418 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47816] VGAM3418 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3418 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3418 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3418 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3418 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47817] The complementary binding of VGAM3418 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3418 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3418 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3418 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47818] It is appreciated that VGAM3418 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3418 host target genes. The mRNA of each one of this plurality of VGAM3418 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3418 RNA, herein designated VGAM RNA, and which when bound by VGAM3418 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3418 host target proteins.

[47819] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3418 gene, herein designated VGAM GENE, on one or more VGAM3418 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47820] It is yet further appreciated that a function of VGAM3418 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3418 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3418 correlate with, and may be deduced from, the identity of the host target genes which VGAM3418 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[47821] Nucleotide sequences of the VGAM3418 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3418 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3418 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3418 are further described hereinbelow with reference to Table 1.

[47822] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3418 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47823] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3419 (VGAM3419) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47824] VGAM3419 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3419 was detected is described hereinabove with reference to Figs. 2–8.

[47825] VGAM3419 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Saimiriine herpesvirus 2. VGAM3419 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47826] VGAM3419 gene, herein designated VGAM GENE, encodes a VGAM3419 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3419 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3419 precursor RNA is designated SEQ ID:77010, and is provided hereinbelow with reference to the sequence listing part.

[47827] VGAM3419 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3419 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47828] An enzyme complex designated DICER COMPLEX, dices the VGAM3419 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3419 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3419 RNA is designated SEQ ID:77011, and is provided hereinbelow with reference to the sequence listing part.

[47829] VGAM3419 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3419 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3419 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47830] VGAM3419 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3419 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3419 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3419 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3419 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[47831] The complementary binding of VGAM3419 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3419 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3419 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3419 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47832] It is appreciated that VGAM3419 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3419 host target genes. The mRNA of each one of this plurality of VGAM3419 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3419 RNA, herein designated VGAM RNA, and which when bound by VGAM3419 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3419 host target proteins.

[47833] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3419 gene, herein designated VGAM GENE, on one or more VGAM3419 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47834] It is yet further appreciated that a function of VGAM3419 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3419 include diagnosis, prevention and treatment of viral infection by Saimiriine herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3419 correlate with, and may be deduced from, the identity of the host target genes which VGAM3419 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[47835] Nucleotide sequences of the VGAM3419 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3419 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3419 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3419 are further described hereinbelow with reference to Table 1.

[47836] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3419 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47837] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3420 (VGAM3420) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47838] VGAM3420 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3420 was detected is described hereinabove with reference to Figs. 2–8.

[47839] VGAM3420 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sorghum mosaic virus. VGAM3420 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47840] VGAM3420 gene, herein designated VGAM GENE, encodes a VGAM3420 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3420 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3420 precursor RNA is designated SEQ ID:77022, and is provided hereinbelow with reference to the sequence listing part.

[47841] VGAM3420 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3420 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47842] An enzyme complex designated DICER COMPLEX, dices the VGAM3420 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3420 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3420 RNA is designated SEQ ID:77023, and is provided hereinbelow with reference to the sequence listing part.

[47843] VGAM3420 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3420 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3420 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[47844] VGAM3420 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3420 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3420 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3420 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3420 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47845] The complementary binding of VGAM3420 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3420 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3420 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3420 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47846] It is appreciated that VGAM3420 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3420 host target genes. The mRNA of each one of this plurality of VGAM3420 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3420 RNA, herein designated VGAM RNA, and which when bound by VGAM3420 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3420 host target proteins.

[47847] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3420 gene, herein designated VGAM GENE, on one

or more VGAM3420 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47848] It is yet further appreciated that a function of VGAM3420 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3420 include diagnosis, prevention and treatment of viral infection by Sorghum mosaic virus. Specific functions, and accordingly utilities, of VGAM3420 correlate with, and may be deduced from, the identity of the host target genes which VGAM3420 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47849] Nucleotide sequences of the VGAM3420 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3420 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3420 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3420 are further described hereinbelow with reference to Table 1.

[47850] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3420 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47851] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3421 (VGAM3421) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47852] VGAM3421 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3421 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[47853] VGAM3421 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sorghum mosaic virus. VGAM3421 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47854] VGAM3421 gene, herein designated VGAM GENE, encodes a VGAM3421 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3421 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3421 precursor RNA is designated SEQ ID:77036, and is provided hereinbelow with reference to the sequence listing part.

[47855] VGAM3421 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3421 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47856] An enzyme complex designated DICER COMPLEX, dices the VGAM3421 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3421 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3421 RNA is designated SEQ ID:77037, and is provided hereinbelow with reference to the sequence listing part.

[47857] VGAM3421 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3421 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3421 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47858] VGAM3421 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3421 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3421 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3421 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3421 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47859] The complementary binding of VGAM3421 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3421 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3421 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3421 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47860] It is appreciated that VGAM3421 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3421 host target genes. The mRNA of each one of this plurality of VGAM3421 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3421 RNA, herein designated VGAM RNA, and which when bound by VGAM3421 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3421 host target proteins.

[47861] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3421 gene, herein designated VGAM GENE, on one or more VGAM3421 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47862] It is yet further appreciated that a function of VGAM3421 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3421 include diagnosis, prevention and treatment of viral infection by Sorghum mosaic virus. Specific functions, and accordingly utilities, of VGAM3421 correlate with, and may be deduced from, the identity of the host target genes which VGAM3421 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47863] Nucleotide sequences of the VGAM3421 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3421 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3421 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3421 are further described hereinbelow with reference to Table 1.

[47864] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3421 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47865] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3422 (VGAM3422) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47866] VGAM3422 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3422 was detected is described hereinabove with reference to Figs. 2-8.

[47867] VGAM3422 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3422 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47868] VGAM3422 gene, herein designated VGAM GENE, encodes a VGAM3422 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3422 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3422 precursor RNA is designated SEQ ID:77046, and is provided hereinbelow with reference to the sequence listing part.

[47869] VGAM3422 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3422 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[47870] An enzyme complex designated DICER COMPLEX, dices the VGAM3422 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3422 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3422 RNA is designated SEQ ID:77047, and is provided hereinbelow with reference to the sequence listing part.

[47871] VGAM3422 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3422 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3422 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47872] VGAM3422 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3422 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3422 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3422 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3422 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47873] The complementary binding of VGAM3422 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3422 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3422 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3422 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47874] It is appreciated that VGAM3422 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3422 host target genes. The mRNA of each one of this plurality of VGAM3422 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3422 RNA, herein designated VGAM RNA, and which when bound by VGAM3422 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3422 host target proteins.

[47875] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3422 gene, herein designated VGAM GENE, on one or more VGAM3422 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47876] It is yet further appreciated that a function of VGAM3422 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3422 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3422 correlate with, and may be deduced from, the identity of the host target genes which VGAM3422 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47877] Nucleotide sequences of the VGAM3422 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3422 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3422 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3422 are further described hereinbelow with reference to Table 1.

[47878] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3422 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47879] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3423 (VGAM3423) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47880] VGAM3423 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3423 was detected is described hereinabove with reference to Figs. 2-8.

[47881] VGAM3423 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Alcelaphine herpesvirus 1. VGAM3423 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47882] VGAM3423 gene, herein designated VGAM GENE, encodes a VGAM3423 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3423 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3423 precursor RNA is designated SEQ ID:77050, and is provided hereinbelow with reference to the sequence listing part.

[47883] VGAM3423 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3423 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47884] An enzyme complex designated DICER COMPLEX, dices the VGAM3423 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3423 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3423 RNA is designated SEQ ID:77051, and is provided hereinbelow with reference to the sequence listing part.

[47885] VGAM3423 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3423 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3423 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47886] VGAM3423 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3423 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3423 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3423 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3423 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47887] The complementary binding of VGAM3423 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3423 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3423 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3423 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47888] It is appreciated that VGAM3423 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3423 host target genes. The mRNA of each one of this plurality of VGAM3423 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3423 RNA, herein designated VGAM RNA, and which when bound by VGAM3423 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3423 host target proteins.

[47889] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3423 gene, herein designated VGAM GENE, on one or more VGAM3423 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47890] It is yet further appreciated that a function of VGAM3423 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3423 include diagnosis, prevention and treatment of viral infection by Alcelaphine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3423 correlate with, and may be deduced from, the identity of the host target genes which VGAM3423 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47891] Nucleotide sequences of the VGAM3423 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3423 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3423 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3423 are further described hereinbelow with reference to Table 1.

[47892] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3423 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47893] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3424 (VGAM3424) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47894] VGAM3424 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3424 was detected is described hereinabove with reference to Figs. 2-8.

[47895] VGAM3424 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4.

VGAM3424 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47896] VGAM3424 gene, herein designated VGAM GENE, encodes a VGAM3424 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3424 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3424 precursor RNA is designated SEQ ID:77074, and is provided hereinbelow with reference to the sequence listing part.

[47897] VGAM3424 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3424 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47898] An enzyme complex designated DICER COMPLEX, dices

the VGAM3424 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3424 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3424 RNA is designated SEQ ID:77075, and is provided hereinbelow with reference to the sequence listing part.

[47899] VGAM3424 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3424 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3424 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47900] VGAM3424 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3424 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3424 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3424 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3424 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47901] The complementary binding of VGAM3424 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3424 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3424 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3424 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47902] It is appreciated that VGAM3424 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3424 host target genes. The mRNA of each one of this plurality of VGAM3424 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3424 RNA, herein designated VGAM RNA, and which when bound by VGAM3424 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3424 host target proteins.

[47903] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3424 gene, herein designated VGAM GENE, on one or more VGAM3424 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47904] It is yet further appreciated that a function of VGAM3424 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3424 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3424 correlate with, and may be deduced from, the identity of the host target genes which VGAM3424 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47905] Nucleotide sequences of the VGAM3424 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3424 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3424 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3424 are further described hereinbelow with reference to Table 1.

[47906] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3424 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47907] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3425 (VGAM3425) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47908] VGAM3425 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3425 was detected is described hereinabove with reference to Figs. 2-8.

[47909] VGAM3425 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3425 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[47910] VGAM3425 gene, herein designated VGAM GENE, encodes a VGAM3425 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3425 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3425 precursor RNA is designated SEQ ID:77080, and is provided hereinbelow with reference to the sequence listing part.

[47911] VGAM3425 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3425 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47912] An enzyme complex designated DICER COMPLEX, dices the VGAM3425 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3425 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3425 RNA is designated SEQ ID:77081, and is provided hereinbelow with reference to the sequence listing part.

[47913] VGAM3425 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3425 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3425 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47914] VGAM3425 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3425 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3425 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3425 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3425 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47915] The complementary binding of VGAM3425 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3425 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3425 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3425 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47916] It is appreciated that VGAM3425 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3425 host target genes. The mRNA of each one of this plurality of VGAM3425 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3425 RNA, herein designated VGAM RNA, and which when bound by VGAM3425 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3425 host target proteins.

[47917] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3425 gene, herein designated VGAM GENE, on one or more VGAM3425 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47918] It is yet further appreciated that a function of VGAM3425 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3425 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3425 correlate with, and may be deduced from, the identity of the host target genes which VGAM3425 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47919] Nucleotide sequences of the VGAM3425 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3425 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3425 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3425 are further described hereinbelow with reference to Table 1.

[47920] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3425 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47921] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3426 (VGAM3426) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47922] VGAM3426 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3426 was detected is described hereinabove with reference to Figs. 2-8.

[47923] VGAM3426 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1.

VGAM3426 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47924] VGAM3426 gene, herein designated VGAM GENE, encodes a VGAM3426 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3426 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3426 precursor RNA is designated SEQ ID:77091, and is provided hereinbelow with reference to the sequence listing part.

[47925] VGAM3426 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3426 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47926] An enzyme complex designated DICER COMPLEX, dices

the VGAM3426 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3426 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3426 RNA is designated SEQ ID:77092, and is provided hereinbelow with reference to the sequence listing part.

[47927] VGAM3426 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3426 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3426 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47928] VGAM3426 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3426 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3426 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3426 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3426 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47929] The complementary binding of VGAM3426 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3426 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3426 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3426 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47930] It is appreciated that VGAM3426 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3426 host target genes. The mRNA of each one of this plurality of VGAM3426 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3426 RNA, herein designated VGAM RNA, and which when bound by VGAM3426 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3426 host target proteins.

[47931] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3426 gene, herein designated VGAM GENE, on one or more VGAM3426 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47932] It is yet further appreciated that a function of VGAM3426 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3426 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3426 correlate with, and may be deduced from, the identity of the host target genes which VGAM3426 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47933] Nucleotide sequences of the VGAM3426 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3426 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3426 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3426 are further described hereinbelow with reference to Table 1.

[47934] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3426 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47935] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3427 (VGAM3427) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47936] VGAM3427 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3427 was detected is described hereinabove with reference to Figs. 2-8.

[47937] VGAM3427 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3427 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[47938] VGAM3427 gene, herein designated VGAM GENE, encodes a VGAM3427 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3427 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3427 precursor RNA is designated SEQ ID:77094, and is provided hereinbelow with reference to the sequence listing part.

[47939] VGAM3427 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3427 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47940] An enzyme complex designated DICER COMPLEX, dices the VGAM3427 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3427 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3427 RNA is designated SEQ ID:77095, and is provided hereinbelow with reference to the sequence listing part.

[47941] VGAM3427 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3427 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3427 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47942] VGAM3427 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3427 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3427 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3427 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3427 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47943] The complementary binding of VGAM3427 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3427 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3427

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3427 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47944] It is appreciated that VGAM3427 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3427 host target genes. The mRNA of each one of this plurality of VGAM3427 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3427 RNA, herein designated VGAM RNA, and which when bound by VGAM3427 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3427 host target proteins.

[47945] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3427 gene, herein designated VGAM GENE, on one or more VGAM3427 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47946] It is yet further appreciated that a function of VGAM3427 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3427 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3427 correlate with, and may be deduced from, the identity of the host target genes which VGAM3427 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47947] Nucleotide sequences of the VGAM3427 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3427 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3427 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3427 are further described hereinbelow with reference to Table 1.

[47948] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3427 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47949] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3428 (VGAM3428) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47950] VGAM3428 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3428 was detected is described hereinabove with reference to Figs. 2-8.

[47951] VGAM3428 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lumpy skin disease virus. VGAM3428 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[47952] VGAM3428 gene, herein designated VGAM GENE, encodes a VGAM3428 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3428 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3428 precursor RNA is designated SEQ ID:77101, and is provided hereinbelow with reference to the sequence listing part.

[47953] VGAM3428 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3428 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47954] An enzyme complex designated DICER COMPLEX, dices the VGAM3428 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3428 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3428 RNA is designated SEQ ID:77102, and is provided hereinbelow with reference to the sequence listing part.

[47955] VGAM3428 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3428 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3428 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47956] VGAM3428 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3428 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3428 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3428 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3428 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47957] The complementary binding of VGAM3428 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3428 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3428 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3428 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47958] It is appreciated that VGAM3428 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3428 host target genes. The mRNA of each one of this plurality of VGAM3428 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3428 RNA, herein designated VGAM RNA, and which when bound by VGAM3428 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3428 host target proteins.

[47959] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3428 gene, herein designated VGAM GENE, on one or more VGAM3428 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47960] It is yet further appreciated that a function of VGAM3428 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3428 include diagnosis, prevention and treatment of viral infection by Lumpy skin disease virus. Specific functions, and accordingly utilities, of VGAM3428 correlate with, and may be deduced from, the identity of the host target genes which VGAM3428 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47961] Nucleotide sequences of the VGAM3428 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3428 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3428 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3428 are further

described hereinbelow with reference to Table 1.

[47962] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3428 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47963] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3429 (VGAM3429) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47964] VGAM3429 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3429 was detected is described hereinabove with reference to Figs. 2-8.

[47965] VGAM3429 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lumpy skin disease virus. VGAM3429 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47966] VGAM3429 gene, herein designated VGAM GENE, encodes a VGAM3429 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3429 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3429 precursor RNA is designated SEQ ID:77140, and is provided hereinbelow with reference to the sequence listing part.

[47967] VGAM3429 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3429 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47968] An enzyme complex designated DICER COMPLEX, dices the VGAM3429 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3429 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3429 RNA is designated SEQ ID:77141, and is provided hereinbelow with reference to the sequence listing part.

[47969] VGAM3429 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3429 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3429 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47970] VGAM3429 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3429 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3429 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3429 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3429 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47971] The complementary binding of VGAM3429 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3429 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3429 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3429 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[47972] It is appreciated that VGAM3429 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3429 host target genes. The mRNA of each one of this plurality of VGAM3429 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3429 RNA, herein designated VGAM RNA, and which when bound by VGAM3429 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3429 host target proteins.

[47973] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3429 gene, herein designated VGAM GENE, on one or more VGAM3429 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47974] It is yet further appreciated that a function of VGAM3429 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3429 include diagnosis, prevention and treatment of viral infection by Lumpy skin disease virus. Specific functions, and accordingly utilities, of VGAM3429 correlate with, and may be deduced from, the identity of the host target genes which VGAM3429 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47975] Nucleotide sequences of the VGAM3429 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3429 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3429 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3429 are further described hereinbelow with reference to Table 1.

[47976] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3429 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47977] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3430 (VGAM3430) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47978] VGAM3430 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3430 was detected is described hereinabove with reference to Figs. 2-8.

[47979] VGAM3430 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Barley yellow mosaic virus. VGAM3430 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47980] VGAM3430 gene, herein designated VGAM GENE, encodes

a VGAM3430 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3430 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3430 precursor RNA is designated SEQ ID:77151, and is provided hereinbelow with reference to the sequence listing part.

[47981] VGAM3430 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3430 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47982] An enzyme complex designated DICER COMPLEX, dices the VGAM3430 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3430 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3430 RNA is designated SEQ ID:77152, and is provided hereinbelow with reference to the sequence listing part.

[47983] VGAM3430 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3430 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3430 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47984] VGAM3430 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3430 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3430 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3430 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3430 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47985] The complementary binding of VGAM3430 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3430 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3430 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3430 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[47986] It is appreciated that VGAM3430 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3430 host target genes. The mRNA of each one of this plurality of VGAM3430 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3430 RNA, herein designated VGAM RNA, and which when bound by VGAM3430 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3430 host target proteins.

[47987] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3430 gene, herein designated VGAM GENE, on one or more VGAM3430 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[47988] It is yet further appreciated that a function of VGAM3430 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3430 include diagnosis, prevention and treatment of viral infection by Barley yellow mosaic virus. Specific functions, and accordingly utilities, of VGAM3430 correlate with, and may be deduced from, the identity of the host target genes which VGAM3430 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[47989] Nucleotide sequences of the VGAM3430 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3430 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3430 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3430 are further described hereinbelow with reference to Table 1.

[47990] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3430 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[47991] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3431 (VGAM3431) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[47992] VGAM3431 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3431 was detected is described hereinabove with reference to Figs. 2-8.

[47993] VGAM3431 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Indian citrus ringspot virus. VGAM3431 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[47994] VGAM3431 gene, herein designated VGAM GENE, encodes a VGAM3431 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3431 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3431 precursor RNA is designated SEQ ID:77155, and is provided hereinbelow with reference to the sequence listing part.

[47995] VGAM3431 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3431 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[47996] An enzyme complex designated DICER COMPLEX, dices the VGAM3431 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3431 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3431 RNA is designated SEQ ID:77156, and is provided hereinbelow with reference to the sequence listing part.

[47997] VGAM3431 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3431 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3431 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[47998] VGAM3431 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3431 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3431 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3431 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3431 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[47999] The complementary binding of VGAM3431 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3431 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3431 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3431 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48000] It is appreciated that VGAM3431 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3431 host target genes. The mRNA of each one of this plurality of VGAM3431 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3431 RNA, herein designated VGAM RNA, and which when bound by VGAM3431 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3431 host target proteins.

[48001] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3431 gene, herein designated VGAM GENE, on one or more VGAM3431 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48002] It is yet further appreciated that a function of VGAM3431 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3431 include diagnosis, prevention and treatment of viral infection by Indian citrus ringspot virus. Specific functions, and accordingly utilities, of VGAM3431 correlate with, and may be deduced from, the identity of the host target genes which VGAM3431 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48003] Nucleotide sequences of the VGAM3431 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3431 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3431 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3431 are further described hereinbelow with reference to Table 1.

[48004] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3431 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48005] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3432 (VGAM3432) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48006] VGAM3432 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3432 was detected is described hereinabove with reference to Figs. 2-8.

[48007] VGAM3432 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3432 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48008] VGAM3432 gene, herein designated VGAM GENE, encodes a VGAM3432 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3432 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3432 precursor RNA is designated SEQ ID:77167, and is provided hereinbelow with reference to the sequence listing part.

[48009] VGAM3432 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3432 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48010] An enzyme complex designated DICER COMPLEX, dices the VGAM3432 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3432 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3432 RNA is designated SEQ ID:77168, and is provided hereinbelow with reference to the sequence listing part.

[48011] VGAM3432 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3432 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3432 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48012] VGAM3432 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3432 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3432 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3432 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3432 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48013] The complementary binding of VGAM3432 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3432 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3432 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3432 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48014] It is appreciated that VGAM3432 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3432 host target genes. The mRNA of each one of this plurality of VGAM3432 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3432 RNA, herein designated VGAM RNA, and which when bound by VGAM3432 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3432 host target proteins.

[48015] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3432 gene, herein designated VGAM GENE, on one or more VGAM3432 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48016] It is yet further appreciated that a function of VGAM3432 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3432 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3432 correlate with, and may be deduced from, the identity of the host target genes which VGAM3432 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48017] Nucleotide sequences of the VGAM3432 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3432 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3432 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3432 are further described hereinbelow with reference to Table 1.

[48018] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3432 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48019] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3433 (VGAM3433) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48020] VGAM3433 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3433 was detected is described hereinabove with reference to Figs. 2–8.

[48021] VGAM3433 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3433 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48022] VGAM3433 gene, herein designated VGAM GENE, encodes a VGAM3433 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3433 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3433 precursor RNA is designated SEQ ID:77173, and is provided hereinbelow with reference to the sequence listing part.

[48023] VGAM3433 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3433 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48024] An enzyme complex designated DICER COMPLEX, dices the VGAM3433 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3433 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3433 RNA is designated SEQ ID:77174, and is provided hereinbelow with reference to the sequence listing part.

[48025] VGAM3433 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3433 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3433 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48026] VGAM3433 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3433 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3433 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3433 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3433 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48027] The complementary binding of VGAM3433 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3433 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3433 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3433 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48028] It is appreciated that VGAM3433 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3433 host target genes. The mRNA of each one of this plurality of VGAM3433 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3433 RNA, herein designated VGAM RNA, and which when bound by VGAM3433 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3433 host target proteins.

[48029] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3433 gene, herein designated VGAM GENE, on one or more VGAM3433 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [48030] It is yet further appreciated that a function of VGAM3433 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3433 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3433 correlate with, and may be deduced from, the identity of the host target genes which VGAM3433 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [48031] Nucleotide sequences of the VGAM3433 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3433 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3433 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3433 are further described hereinbelow with reference to Table 1.
- [48032] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3433 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48033] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3434 (VGAM3434) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48034] VGAM3434 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3434 was detected is described hereinabove with reference to Figs. 2-8.

[48035] VGAM3434 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus.

VGAM3434 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48036] VGAM3434 gene, herein designated VGAM GENE, encodes a VGAM3434 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3434 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3434 precursor RNA is designated SEQ ID:77177, and is provided hereinbelow with reference to the sequence listing part.

[48037] VGAM3434 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3434 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48038] An enzyme complex designated DICER COMPLEX, dices the VGAM3434 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3434 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3434 RNA is designated SEQ ID:77178, and is provided hereinbelow with reference to the sequence listing part.

[48039] VGAM3434 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3434 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3434 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48040] VGAM3434 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3434 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3434 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3434 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3434 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48041] The complementary binding of VGAM3434 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3434 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3434 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3434 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48042] It is appreciated that VGAM3434 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3434 host target genes. The mRNA of

each one of this plurality of VGAM3434 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3434 RNA, herein designated VGAM RNA, and which when bound by VGAM3434 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3434 host target proteins.

[48043] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3434 gene, herein designated VGAM GENE, on one or more VGAM3434 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[48044] It is yet further appreciated that a function of VGAM3434 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3434 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3434 correlate with, and may be deduced from, the identity of the host target genes which VGAM3434 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48045] Nucleotide sequences of the VGAM3434 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3434 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3434 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3434 are further described hereinbelow with reference to Table 1.

[48046] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3434 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[48047] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3435 (VGAM3435) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48048] VGAM3435 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3435 was detected is described hereinabove with reference to Figs. 2–8.

[48049] VGAM3435 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Myxoma virus. VGAM3435 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48050] VGAM3435 gene, herein designated VGAM GENE, encodes a VGAM3435 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3435 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3435 precursor RNA is designated SEQ ID:77183, and is provided hereinbelow with reference to the sequence listing part.

[48051] VGAM3435 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3435 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48052] An enzyme complex designated DICER COMPLEX, dices the VGAM3435 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3435 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3435 RNA is designated SEQ ID:77184,

and is provided hereinbelow with reference to the sequence listing part.

[48053] VGAM3435 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3435 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3435 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48054] VGAM3435 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3435 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3435 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3435 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3435 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48055] The complementary binding of VGAM3435 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3435 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3435 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3435 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48056] It is appreciated that VGAM3435 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3435 host target genes. The mRNA of each one of this plurality of VGAM3435 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3435 RNA, herein designated VGAM RNA, and which when bound by VGAM3435 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3435 host target proteins.

[48057] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3435 gene, herein designated VGAM GENE, on one or more VGAM3435 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48058] It is yet further appreciated that a function of VGAM3435 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3435 include diagnosis, prevention and treatment of viral infection by Myxoma virus. Specific functions, and accordingly utilities, of VGAM3435 correlate with, and may be deduced from, the identity of the host target genes which VGAM3435 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48059] Nucleotide sequences of the VGAM3435 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3435 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3435 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3435 are further described hereinbelow with reference to Table 1.

[48060] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3435 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48061] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3436 (VGAM3436) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48062] VGAM3436 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3436 was detected is described hereinabove with reference to Figs. 2–8.

[48063] VGAM3436 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rabbit fibroma virus. VGAM3436 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48064] VGAM3436 gene, herein designated VGAM GENE, encodes a VGAM3436 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3436 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3436 precu-

sor RNA is designated SEQ ID:77195, and is provided hereinbelow with reference to the sequence listing part.

[48065] VGAM3436 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3436 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48066] An enzyme complex designated DICER COMPLEX, dices the VGAM3436 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3436 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3436 RNA is designated SEQ ID:77196, and is provided hereinbelow with reference to the se-

quence listing part.

[48067] VGAM3436 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3436 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3436 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48068] VGAM3436 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3436 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3436 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3436 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3436 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48069] The complementary binding of VGAM3436 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3436 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3436 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3436 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48070] It is appreciated that VGAM3436 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3436 host target genes. The mRNA of each one of this plurality of VGAM3436 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3436 RNA, herein designated VGAM RNA, and which when bound by VGAM3436 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3436 host target proteins.

[48071] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3436 gene, herein designated VGAM GENE, on one or more VGAM3436 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48072] It is yet further appreciated that a function of VGAM3436

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3436 include diagnosis, prevention and treatment of viral infection by Rabbit fibroma virus. Specific functions, and accordingly utilities, of VGAM3436 correlate with, and may be deduced from, the identity of the host target genes which VGAM3436 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48073] Nucleotide sequences of the VGAM3436 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3436 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3436 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3436 are further described hereinbelow with reference to Table 1.

[48074] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3436 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48075] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3437 (VGAM3437) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48076] VGAM3437 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3437 was detected is described hereinabove with reference to Figs. 2–8.

[48077] VGAM3437 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Barmah Forest virus. VGAM3437 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48078] VGAM3437 gene, herein designated VGAM GENE, encodes a VGAM3437 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3437 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3437 precursor RNA is designated SEQ ID:77199, and is provided

hereinbelow with reference to the sequence listing part.

[48079] VGAM3437 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3437 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48080] An enzyme complex designated DICER COMPLEX, dices the VGAM3437 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3437 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3437 RNA is designated SEQ ID:77200, and is provided hereinbelow with reference to the sequence listing part.

[48081] VGAM3437 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3437 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3437 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48082] VGAM3437 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3437 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3437 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3437 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3437 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48083] The complementary binding of VGAM3437 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3437 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3437 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3437 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48084] It is appreciated that VGAM3437 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3437 host target genes. The mRNA of each one of this plurality of VGAM3437 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3437 RNA, herein designated VGAM RNA, and which when bound by VGAM3437 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3437 host target proteins.

[48085] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3437 gene, herein designated VGAM GENE, on one or more VGAM3437 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48086] It is yet further appreciated that a function of VGAM3437 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3437 include diagnosis, prevention and treatment of viral infection by Barmah Forest virus. Specific functions, and accordingly utilities, of VGAM3437 correlate with, and may be deduced from, the identity of the host target genes which VGAM3437 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48087] Nucleotide sequences of the VGAM3437 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3437 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3437 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3437 are further described hereinbelow with reference to Table 1.

[48088] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3437 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48089] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3438 (VGAM3438) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48090] VGAM3438 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3438 was detected is described hereinabove with reference to Figs. 2–8.

[48091] VGAM3438 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3438 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48092] VGAM3438 gene, herein designated VGAM GENE, encodes a VGAM3438 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3438 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3438 precursor RNA is designated SEQ ID:77212, and is provided hereinbelow with reference to the sequence listing part.

[48093] VGAM3438 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3438 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48094] An enzyme complex designated DICER COMPLEX, dices the VGAM3438 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3438 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3438 RNA is designated SEQ ID:77213, and is provided hereinbelow with reference to the sequence listing part.

[48095] VGAM3438 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3438 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3438 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48096] VGAM3438 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3438 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3438 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3438 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3438 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48097] The complementary binding of VGAM3438 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3438 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3438 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3438 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48098] It is appreciated that VGAM3438 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3438 host target genes. The mRNA of each one of this plurality of VGAM3438 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3438 RNA, herein designated VGAM

RNA, and which when bound by VGAM3438 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3438 host target proteins.

[48099] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3438 gene, herein designated VGAM GENE, on one or more VGAM3438 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48100] It is yet further appreciated that a function of VGAM3438 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3438 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3438 correlate with, and may be deduced from, the identity of the host target genes which VGAM3438 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48101] Nucleotide sequences of the VGAM3438 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3438 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3438 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3438 are further described hereinbelow with reference to Table 1.

[48102] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3438 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48103] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3439 (VGAM3439) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48104] VGAM3439 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3439 was detected is described hereinabove with reference to Figs. 2-8.

[48105] VGAM3439 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus. VGAM3439 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48106] VGAM3439 gene, herein designated VGAM GENE, encodes a VGAM3439 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3439 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3439 precursor RNA is designated SEQ ID:77234, and is provided hereinbelow with reference to the sequence listing part.

[48107] VGAM3439 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3439 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48108] An enzyme complex designated DICER COMPLEX, dices the VGAM3439 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3439 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3439 RNA is designated SEQ ID:77235, and is provided hereinbelow with reference to the sequence listing part.

[48109] VGAM3439 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3439 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3439 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48110] VGAM3439 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3439 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3439 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3439 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3439 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48111] The complementary binding of VGAM3439 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3439 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3439 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3439 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48112] It is appreciated that VGAM3439 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3439 host target genes. The mRNA of each one of this plurality of VGAM3439 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3439 RNA, herein designated VGAM RNA, and which when bound by VGAM3439 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3439 host target proteins.

[48113] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3439 gene, herein designated VGAM GENE, on one or more VGAM3439 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48114] It is yet further appreciated that a function of VGAM3439 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3439 include diagnosis, prevention and

treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3439 correlate with, and may be deduced from, the identity of the host target genes which VGAM3439 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48115] Nucleotide sequences of the VGAM3439 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3439 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3439 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3439 are further described hereinbelow with reference to Table 1.

[48116] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3439 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48117] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3440 (VGAM3440) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48118] VGAM3440 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3440 was detected is described hereinabove with reference to Figs. 2–8.

[48119] VGAM3440 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus. VGAM3440 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48120] VGAM3440 gene, herein designated VGAM GENE, encodes a VGAM3440 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3440 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3440 precursor RNA is designated SEQ ID:77243, and is provided hereinbelow with reference to the sequence listing part.

[48121] VGAM3440 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3440 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48122] An enzyme complex designated DICER COMPLEX, dices the VGAM3440 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3440 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3440 RNA is designated SEQ ID:77244, and is provided hereinbelow with reference to the sequence listing part.

[48123] VGAM3440 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3440 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3440 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48124] VGAM3440 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3440 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3440 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3440 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3440 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48125] The complementary binding of VGAM3440 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3440 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3440 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3440 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48126] It is appreciated that VGAM3440 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3440 host target genes. The mRNA of each one of this plurality of VGAM3440 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3440 RNA, herein designated VGAM RNA, and which when bound by VGAM3440 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3440 host target proteins.

[48127] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3440 gene, herein designated VGAM GENE, on one or more VGAM3440 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48128] It is yet further appreciated that a function of VGAM3440 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3440 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific

functions, and accordingly utilities, of VGAM3440 correlate with, and may be deduced from, the identity of the host target genes which VGAM3440 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48129] Nucleotide sequences of the VGAM3440 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3440 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3440 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3440 are further described hereinbelow with reference to Table 1.

[48130] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3440 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48131] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3441 (VGAM3441) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[48132] VGAM3441 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3441 was detected is described hereinabove with reference to Figs. 2–8.

[48133] VGAM3441 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Strawberry mild yellow edge virus. VGAM3441 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48134] VGAM3441 gene, herein designated VGAM GENE, encodes a VGAM3441 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3441 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3441 precursor RNA is designated SEQ ID:77265, and is provided hereinbelow with reference to the sequence listing part.

[48135] VGAM3441 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3441 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48136] An enzyme complex designated DICER COMPLEX, dices the VGAM3441 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3441 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3441 RNA is designated SEQ ID:77266, and is provided hereinbelow with reference to the sequence listing part.

[48137] VGAM3441 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3441 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3441 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48138] VGAM3441 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3441 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3441 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3441 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3441 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48139] The complementary binding of VGAM3441 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3441 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3441 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3441 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48140] It is appreciated that VGAM3441 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3441 host target genes. The mRNA of each one of this plurality of VGAM3441 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3441 RNA, herein designated VGAM RNA, and which when bound by VGAM3441 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3441 host target proteins.

[48141] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3441 gene, herein designated VGAM GENE, on one or more VGAM3441 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48142] It is yet further appreciated that a function of VGAM3441 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3441 include diagnosis, prevention and treatment of viral infection by Strawberry mild yellow edge virus. Specific functions, and accordingly utilities, of

VGAM3441 correlate with, and may be deduced from, the identity of the host target genes which VGAM3441 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48143] Nucleotide sequences of the VGAM3441 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3441 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3441 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3441 are further described hereinbelow with reference to Table 1.

[48144] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3441 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48145] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3442 (VGAM3442) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[48146] VGAM3442 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3442 was detected is described hereinabove with reference to Figs. 2–8.

[48147] VGAM3442 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Macaca mulatta rhadinovirus. VGAM3442 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48148] VGAM3442 gene, herein designated VGAM GENE, encodes a VGAM3442 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3442 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3442 precursor RNA is designated SEQ ID:77291, and is provided hereinbelow with reference to the sequence listing part.

[48149] VGAM3442 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3442 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48150] An enzyme complex designated DICER COMPLEX, dices the VGAM3442 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3442 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3442 RNA is designated SEQ ID:77292, and is provided hereinbelow with reference to the sequence listing part.

[48151] VGAM3442 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3442 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3442 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48152] VGAM3442 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3442 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3442 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3442 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3442 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48153] The complementary binding of VGAM3442 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3442 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3442 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3442 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48154] It is appreciated that VGAM3442 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3442 host target genes. The mRNA of each one of this plurality of VGAM3442 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3442 RNA, herein designated VGAM RNA, and which when bound by VGAM3442 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3442 host target proteins.

[48155] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3442 gene, herein designated VGAM GENE, on one or more VGAM3442 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48156] It is yet further appreciated that a function of VGAM3442 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3442 include diagnosis, prevention and treatment of viral infection by *Macaca mulatta* rhadinovirus. Specific functions, and accordingly utilities, of VGAM3442 correlate with, and may be deduced from, the

identity of the host target genes which VGAM3442 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48157] Nucleotide sequences of the VGAM3442 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3442 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3442 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3442 are further described hereinbelow with reference to Table 1.

[48158] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3442 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48159] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3443 (VGAM3443) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48160] VGAM3443 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3443 was detected is described hereinabove with reference to Figs. 2–8.

[48161] VGAM3443 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3443 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48162] VGAM3443 gene, herein designated VGAM GENE, encodes a VGAM3443 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3443 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3443 precursor RNA is designated SEQ ID:77308, and is provided hereinbelow with reference to the sequence listing part.

[48163] VGAM3443 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3443 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48164] An enzyme complex designated DICER COMPLEX, dices the VGAM3443 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3443 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3443 RNA is designated SEQ ID:77309, and is provided hereinbelow with reference to the sequence listing part.

[48165] VGAM3443 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3443 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3443 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48166] VGAM3443 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3443 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3443 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3443 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3443 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48167] The complementary binding of VGAM3443 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3443 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3443 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3443 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48168] It is appreciated that VGAM3443 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3443 host target genes. The mRNA of each one of this plurality of VGAM3443 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3443 RNA, herein designated VGAM RNA, and which when bound by VGAM3443 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3443 host target proteins.

[48169] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3443 gene, herein designated VGAM GENE, on one or more VGAM3443 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48170] It is yet further appreciated that a function of VGAM3443 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3443 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3443 correlate with, and may be deduced from, the identity of the host target genes which VGAM3443 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[48171] Nucleotide sequences of the VGAM3443 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3443 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3443 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3443 are further described hereinbelow with reference to Table 1.

[48172] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3443 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48173] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3444 (VGAM3444) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48174] VGAM3444 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3444 was detected is described hereinabove with reference to Figs. 2–8.

[48175] VGAM3444 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine respiratory syncytial virus. VGAM3444 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48176] VGAM3444 gene, herein designated VGAM GENE, encodes a VGAM3444 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3444 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3444 precursor RNA is designated SEQ ID:77412, and is provided hereinbelow with reference to the sequence listing part.

[48177] VGAM3444 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3444 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48178] An enzyme complex designated DICER COMPLEX, dices the VGAM3444 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3444 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3444 RNA is designated SEQ ID:77413, and is provided hereinbelow with reference to the sequence listing part.

[48179] VGAM3444 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3444 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3444 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48180] VGAM3444 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3444 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3444 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3444 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3444 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[48181] The complementary binding of VGAM3444 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3444 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3444 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3444 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48182] It is appreciated that VGAM3444 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3444 host target genes. The mRNA of each one of this plurality of VGAM3444 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3444 RNA, herein designated VGAM RNA, and which when bound by VGAM3444 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3444 host target proteins.

[48183] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3444 gene, herein designated VGAM GENE, on one or more VGAM3444 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48184] It is yet further appreciated that a function of VGAM3444 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3444 include diagnosis, prevention and treatment of viral infection by Bovine respiratory syncytial virus. Specific functions, and accordingly utilities, of VGAM3444 correlate with, and may be deduced from, the identity of the host target genes which VGAM3444 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[48185] Nucleotide sequences of the VGAM3444 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3444 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3444 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3444 are further described hereinbelow with reference to Table 1.

[48186] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3444 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48187] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3445 (VGAM3445) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48188] VGAM3445 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3445 was detected is described hereinabove with reference to Figs. 2–8.

[48189] VGAM3445 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus.

VGAM3445 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48190] VGAM3445 gene, herein designated VGAM GENE, encodes a VGAM3445 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3445 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3445 precursor RNA is designated SEQ ID:77420, and is provided hereinbelow with reference to the sequence listing part.

[48191] VGAM3445 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3445 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48192] An enzyme complex designated DICER COMPLEX, dices the VGAM3445 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3445 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3445 RNA is designated SEQ ID:77421, and is provided hereinbelow with reference to the sequence listing part.

[48193] VGAM3445 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3445 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3445 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[48194] VGAM3445 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3445 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3445 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3445 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3445 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48195] The complementary binding of VGAM3445 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3445 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3445 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3445 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48196] It is appreciated that VGAM3445 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3445 host target genes. The mRNA of each one of this plurality of VGAM3445 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3445 RNA, herein designated VGAM RNA, and which when bound by VGAM3445 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3445 host target proteins.

[48197] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3445 gene, herein designated VGAM GENE, on one

or more VGAM3445 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48198] It is yet further appreciated that a function of VGAM3445 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3445 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3445 correlate with, and may be deduced from, the identity of the host target genes which VGAM3445 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48199] Nucleotide sequences of the VGAM3445 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3445 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3445 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3445 are further described hereinbelow with reference to Table 1.

[48200] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3445 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48201] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3446 (VGAM3446) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48202] VGAM3446 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3446 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[48203] VGAM3446 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Swinepox virus.

VGAM3446 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48204] VGAM3446 gene, herein designated VGAM GENE, encodes a VGAM3446 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3446 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3446 precursor RNA is designated SEQ ID:77426, and is provided hereinbelow with reference to the sequence listing part.

[48205] VGAM3446 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3446 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48206] An enzyme complex designated DICER COMPLEX, dices the VGAM3446 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3446 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3446 RNA is designated SEQ ID:77427, and is provided hereinbelow with reference to the sequence listing part.

[48207] VGAM3446 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3446 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3446 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48208] VGAM3446 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3446 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3446 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3446 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3446 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48209] The complementary binding of VGAM3446 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3446 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3446 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3446 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48210] It is appreciated that VGAM3446 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3446 host target genes. The mRNA of each one of this plurality of VGAM3446 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3446 RNA, herein designated VGAM RNA, and which when bound by VGAM3446 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3446 host target proteins.

[48211] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3446 gene, herein designated VGAM GENE, on one or more VGAM3446 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48212] It is yet further appreciated that a function of VGAM3446 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3446 include diagnosis, prevention and treatment of viral infection by Swinepox virus. Specific functions, and accordingly utilities, of VGAM3446 correlate with, and may be deduced from, the identity of the host target genes which VGAM3446 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48213] Nucleotide sequences of the VGAM3446 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3446 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3446 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3446 are further described hereinbelow with reference to Table 1.

[48214] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3446 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48215] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3447 (VGAM3447) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48216] VGAM3447 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3447 was detected is described hereinabove with reference to Figs. 2-8.

[48217] VGAM3447 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus.

VGAM3447 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48218] VGAM3447 gene, herein designated VGAM GENE, encodes a VGAM3447 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3447 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3447 precursor RNA is designated SEQ ID:77444, and is provided hereinbelow with reference to the sequence listing part.

[48219] VGAM3447 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3447 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[48220] An enzyme complex designated DICER COMPLEX, dices the VGAM3447 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3447 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3447 RNA is designated SEQ ID:77445, and is provided hereinbelow with reference to the sequence listing part.

[48221] VGAM3447 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3447 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3447 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48222] VGAM3447 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3447 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3447 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3447 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3447 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48223] The complementary binding of VGAM3447 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3447 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3447 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3447 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48224] It is appreciated that VGAM3447 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3447 host target genes. The mRNA of each one of this plurality of VGAM3447 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3447 RNA, herein designated VGAM RNA, and which when bound by VGAM3447 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3447 host target proteins.

[48225] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3447 gene, herein designated VGAM GENE, on one or more VGAM3447 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48226] It is yet further appreciated that a function of VGAM3447 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3447 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3447 correlate with, and may be deduced from, the identity of the host target genes which VGAM3447 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48227] Nucleotide sequences of the VGAM3447 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3447 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3447 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3447 are further described hereinbelow with reference to Table 1.

[48228] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3447 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48229] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3448 (VGAM3448) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48230] VGAM3448 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3448 was detected is described hereinabove with reference to Figs. 2-8.

[48231] VGAM3448 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of *Ophiostoma novo-ulmi* mitovirus 5-Ld. VGAM3448 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48232] VGAM3448 gene, herein designated VGAM GENE, encodes a VGAM3448 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3448 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3448 precursor RNA is designated SEQ ID:77455, and is provided hereinbelow with reference to the sequence listing part.

[48233] VGAM3448 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3448 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48234] An enzyme complex designated DICER COMPLEX, dices the VGAM3448 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3448 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3448 RNA is designated SEQ ID:77456, and is provided hereinbelow with reference to the sequence listing part.

[48235] VGAM3448 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3448 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3448 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48236] VGAM3448 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3448 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3448 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3448 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3448 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48237] The complementary binding of VGAM3448 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3448 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3448 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3448 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48238] It is appreciated that VGAM3448 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3448 host target genes. The mRNA of each one of this plurality of VGAM3448 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3448 RNA, herein designated VGAM RNA, and which when bound by VGAM3448 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3448 host target proteins.

[48239] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3448 gene, herein designated VGAM GENE, on one or more VGAM3448 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48240] It is yet further appreciated that a function of VGAM3448 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3448 include diagnosis, prevention and treatment of viral infection by *Ophiostoma novo-ulmi* mitovirus 5-Ld. Specific functions, and accordingly utilities, of VGAM3448 correlate with, and may be deduced from, the identity of the host target genes which VGAM3448 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48241] Nucleotide sequences of the VGAM3448 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3448 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3448 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3448 are further described hereinbelow with reference to Table 1.

[48242] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3448 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48243] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3449 (VGAM3449) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48244] VGAM3449 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3449 was detected is described hereinabove with reference to Figs. 2-8.

[48245] VGAM3449 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human respiratory syn-

cytial virus. VGAM3449 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48246] VGAM3449 gene, herein designated VGAM GENE, encodes a VGAM3449 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3449 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3449 precursor RNA is designated SEQ ID:77466, and is provided hereinbelow with reference to the sequence listing part.

[48247] VGAM3449 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3449 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48248] An enzyme complex designated DICER COMPLEX, dices

the VGAM3449 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3449 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3449 RNA is designated SEQ ID:77467, and is provided hereinbelow with reference to the sequence listing part.

[48249] VGAM3449 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3449 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3449 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48250] VGAM3449 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3449 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3449 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3449 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3449 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48251] The complementary binding of VGAM3449 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3449 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3449 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3449 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48252] It is appreciated that VGAM3449 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3449 host target genes. The mRNA of each one of this plurality of VGAM3449 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3449 RNA, herein designated VGAM RNA, and which when bound by VGAM3449 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3449 host target proteins.

[48253] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3449 gene, herein designated VGAM GENE, on one or more VGAM3449 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48254] It is yet further appreciated that a function of VGAM3449 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3449 include diagnosis, prevention and treatment of viral infection by Human respiratory syncytial virus. Specific functions, and accordingly utilities, of VGAM3449 correlate with, and may be deduced from, the identity of the host target genes which VGAM3449 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48255] Nucleotide sequences of the VGAM3449 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3449 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3449 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3449 are further described hereinbelow with reference to Table 1.

[48256] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3449 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48257] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3450 (VGAM3450) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48258] VGAM3450 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3450 was detected is described hereinabove with reference to Figs. 2-8.

[48259] VGAM3450 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3450 host target gene, herein design-

nated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48260] VGAM3450 gene, herein designated VGAM GENE, encodes a VGAM3450 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3450 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3450 precursor RNA is designated SEQ ID:77489, and is provided hereinbelow with reference to the sequence listing part.

[48261] VGAM3450 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3450 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48262] An enzyme complex designated DICER COMPLEX, dices the VGAM3450 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3450 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3450 RNA is designated SEQ ID:77490, and is provided hereinbelow with reference to the sequence listing part.

[48263] VGAM3450 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3450 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3450 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48264] VGAM3450 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3450 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3450 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3450 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3450 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48265] The complementary binding of VGAM3450 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3450 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3450

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3450 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48266] It is appreciated that VGAM3450 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3450 host target genes. The mRNA of each one of this plurality of VGAM3450 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3450 RNA, herein designated VGAM RNA, and which when bound by VGAM3450 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3450 host target proteins.

[48267] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3450 gene, herein designated VGAM GENE, on one or more VGAM3450 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48268] It is yet further appreciated that a function of VGAM3450 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3450 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3450 correlate with, and may be deduced from, the identity of the host target genes which VGAM3450 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48269] Nucleotide sequences of the VGAM3450 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3450 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3450 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3450 are further described hereinbelow with reference to Table 1.

[48270] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3450 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48271] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3451 (VGAM3451) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48272] VGAM3451 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3451 was detected is described hereinabove with reference to Figs. 2-8.

[48273] VGAM3451 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3451 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene con-

tained in the human genome.

[48274] VGAM3451 gene, herein designated VGAM GENE, encodes a VGAM3451 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3451 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3451 precursor RNA is designated SEQ ID:77493, and is provided hereinbelow with reference to the sequence listing part.

[48275] VGAM3451 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3451 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48276] An enzyme complex designated DICER COMPLEX, dices the VGAM3451 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3451 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3451 RNA is designated SEQ ID:77494, and is provided hereinbelow with reference to the sequence listing part.

[48277] VGAM3451 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3451 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3451 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48278] VGAM3451 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3451 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3451 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3451 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3451 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48279] The complementary binding of VGAM3451 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3451 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3451 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3451 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48280] It is appreciated that VGAM3451 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3451 host target genes. The mRNA of each one of this plurality of VGAM3451 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3451 RNA, herein designated VGAM RNA, and which when bound by VGAM3451 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3451 host target proteins.

[48281] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3451 gene, herein designated VGAM GENE, on one or more VGAM3451 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48282] It is yet further appreciated that a function of VGAM3451 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3451 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3451 correlate with, and may be deduced from, the identity of the host target genes which VGAM3451 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48283] Nucleotide sequences of the VGAM3451 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3451 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3451 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3451 are further

described hereinbelow with reference to Table 1.

[48284] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3451 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48285] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3452 (VGAM3452) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48286] VGAM3452 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3452 was detected is described hereinabove with reference to Figs. 2-8.

[48287] VGAM3452 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3452 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48288] VGAM3452 gene, herein designated VGAM GENE, encodes a VGAM3452 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3452 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3452 precursor RNA is designated SEQ ID:77517, and is provided hereinbelow with reference to the sequence listing part.

[48289] VGAM3452 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3452 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48290] An enzyme complex designated DICER COMPLEX, dices the VGAM3452 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3452 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3452 RNA is designated SEQ ID:77518, and is provided hereinbelow with reference to the sequence listing part.

[48291] VGAM3452 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3452 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3452 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48292] VGAM3452 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3452 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3452 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3452 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3452 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48293] The complementary binding of VGAM3452 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3452 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3452 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3452 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48294] It is appreciated that VGAM3452 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3452 host target genes. The mRNA of each one of this plurality of VGAM3452 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3452 RNA, herein designated VGAM RNA, and which when bound by VGAM3452 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3452 host target proteins.

[48295] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3452 gene, herein designated VGAM GENE, on one or more VGAM3452 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48296] It is yet further appreciated that a function of VGAM3452 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3452 include diagnosis, prevention and treatment of viral infection by *Melanoplus sanguinipes* entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3452 correlate with, and may be deduced from, the identity of the host target genes which VGAM3452 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48297] Nucleotide sequences of the VGAM3452 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3452 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3452 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3452 are further described hereinbelow with reference to Table 1.

[48298] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3452 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48299] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3453 (VGAM3453) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48300] VGAM3453 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3453 was detected is described hereinabove with reference to Figs. 2-8.

[48301] VGAM3453 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ateline herpesvirus 3. VGAM3453 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48302] VGAM3453 gene, herein designated VGAM GENE, encodes

a VGAM3453 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3453 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3453 precursor RNA is designated SEQ ID:77520, and is provided hereinbelow with reference to the sequence listing part.

[48303] VGAM3453 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3453 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48304] An enzyme complex designated DICER COMPLEX, dices the VGAM3453 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3453 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3453 RNA is designated SEQ ID:77521, and is provided hereinbelow with reference to the sequence listing part.

[48305] VGAM3453 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3453 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3453 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48306] VGAM3453 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3453 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3453 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3453 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3453 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48307] The complementary binding of VGAM3453 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3453 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3453 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3453 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[48308] It is appreciated that VGAM3453 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3453 host target genes. The mRNA of each one of this plurality of VGAM3453 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3453 RNA, herein designated VGAM RNA, and which when bound by VGAM3453 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3453 host target proteins.

[48309] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3453 gene, herein designated VGAM GENE, on one or more VGAM3453 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48310] It is yet further appreciated that a function of VGAM3453 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3453 include diagnosis, prevention and treatment of viral infection by Ateline herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3453 correlate with, and may be deduced from, the identity of the host target genes which VGAM3453 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48311] Nucleotide sequences of the VGAM3453 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3453 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3453 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3453 are further described hereinbelow with reference to Table 1.

[48312] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3453 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48313] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3454 (VGAM3454) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48314] VGAM3454 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3454 was detected is described hereinabove with reference to Figs. 2-8.

[48315] VGAM3454 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Myxoma virus. VGAM3454 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48316] VGAM3454 gene, herein designated VGAM GENE, encodes a VGAM3454 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3454 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3454 precursor RNA is designated SEQ ID:77534, and is provided hereinbelow with reference to the sequence listing part.

[48317] VGAM3454 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3454 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48318] An enzyme complex designated DICER COMPLEX, dices the VGAM3454 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3454 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3454 RNA is designated SEQ ID:77535, and is provided hereinbelow with reference to the sequence listing part.

[48319] VGAM3454 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3454 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3454 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48320] VGAM3454 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3454 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3454 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3454 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3454 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48321] The complementary binding of VGAM3454 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3454 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3454 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3454 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48322] It is appreciated that VGAM3454 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3454 host target genes. The mRNA of each one of this plurality of VGAM3454 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3454 RNA, herein designated VGAM RNA, and which when bound by VGAM3454 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3454 host target proteins.

[48323] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3454 gene, herein designated VGAM GENE, on one or more VGAM3454 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48324] It is yet further appreciated that a function of VGAM3454 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3454 include diagnosis, prevention and treatment of viral infection by Myxoma virus. Specific functions, and accordingly utilities, of VGAM3454 correlate with, and may be deduced from, the identity of the host target genes which VGAM3454 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48325] Nucleotide sequences of the VGAM3454 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3454 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3454 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3454 are further described hereinbelow with reference to Table 1.

[48326] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3454 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48327] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3455 (VGAM3455) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48328] VGAM3455 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3455 was detected is described hereinabove with reference to Figs. 2-8.

[48329] VGAM3455 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Taura syndrome virus. VGAM3455 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48330] VGAM3455 gene, herein designated VGAM GENE, encodes a VGAM3455 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3455 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3455 precursor RNA is designated SEQ ID:77563, and is provided hereinbelow with reference to the sequence listing part.

[48331] VGAM3455 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3455 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48332] An enzyme complex designated DICER COMPLEX, dices the VGAM3455 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3455 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3455 RNA is designated SEQ ID:77564, and is provided hereinbelow with reference to the sequence listing part.

[48333] VGAM3455 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3455 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3455 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48334] VGAM3455 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3455 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3455 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3455 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3455 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48335] The complementary binding of VGAM3455 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3455 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3455 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3455 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48336] It is appreciated that VGAM3455 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3455 host target genes. The mRNA of each one of this plurality of VGAM3455 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3455 RNA, herein designated VGAM RNA, and which when bound by VGAM3455 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3455 host target proteins.

[48337] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3455 gene, herein designated VGAM GENE, on one or more VGAM3455 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48338] It is yet further appreciated that a function of VGAM3455 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3455 include diagnosis, prevention and treatment of viral infection by Taura syndrome virus. Specific functions, and accordingly utilities, of VGAM3455 correlate with, and may be deduced from, the identity of the host target genes which VGAM3455 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48339] Nucleotide sequences of the VGAM3455 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3455 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3455 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3455 are further described hereinbelow with reference to Table 1.

[48340] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3455 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48341] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3456 (VGAM3456) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48342] VGAM3456 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3456 was detected is described hereinabove with reference to Figs. 2–8.

[48343] VGAM3456 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3456 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48344] VGAM3456 gene, herein designated VGAM GENE, encodes a VGAM3456 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3456 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3456 precursor RNA is designated SEQ ID:77584, and is provided hereinbelow with reference to the sequence listing part.

[48345] VGAM3456 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3456 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48346] An enzyme complex designated DICER COMPLEX, dices the VGAM3456 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3456 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3456 RNA is designated SEQ ID:77585, and is provided hereinbelow with reference to the sequence listing part.

[48347] VGAM3456 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3456 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3456 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48348] VGAM3456 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3456 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3456 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3456 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3456 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48349] The complementary binding of VGAM3456 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3456 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3456 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3456 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48350] It is appreciated that VGAM3456 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3456 host target genes. The mRNA of each one of this plurality of VGAM3456 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3456 RNA, herein designated VGAM RNA, and which when bound by VGAM3456 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3456 host target proteins.

[48351] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3456 gene, herein designated VGAM GENE, on one or more VGAM3456 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [48352] It is yet further appreciated that a function of VGAM3456 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3456 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3456 correlate with, and may be deduced from, the identity of the host target genes which VGAM3456 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [48353] Nucleotide sequences of the VGAM3456 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3456 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3456 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3456 are further described hereinbelow with reference to Table 1.
- [48354] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3456 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48355] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3457 (VGAM3457) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48356] VGAM3457 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3457 was detected is described hereinabove with reference to Figs. 2–8.

[48357] VGAM3457 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3457 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48358] VGAM3457 gene, herein designated VGAM GENE, encodes a VGAM3457 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3457 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3457 precursor RNA is designated SEQ ID:77596, and is provided hereinbelow with reference to the sequence listing part.

[48359] VGAM3457 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3457 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48360] An enzyme complex designated DICER COMPLEX, dices the VGAM3457 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3457 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3457 RNA is designated SEQ ID:77597, and is provided hereinbelow with reference to the sequence listing part.

[48361] VGAM3457 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3457 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3457 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48362] VGAM3457 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3457 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3457 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3457 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3457 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48363] The complementary binding of VGAM3457 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3457 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3457 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3457 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48364] It is appreciated that VGAM3457 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3457 host target genes. The mRNA of

each one of this plurality of VGAM3457 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3457 RNA, herein designated VGAM RNA, and which when bound by VGAM3457 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3457 host target proteins.

[48365] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3457 gene, herein designated VGAM GENE, on one or more VGAM3457 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[48366] It is yet further appreciated that a function of VGAM3457 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3457 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3457 correlate with, and may be deduced from, the identity of the host target genes which VGAM3457 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48367] Nucleotide sequences of the VGAM3457 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3457 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3457 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3457 are further described hereinbelow with reference to Table 1.

[48368] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3457 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[48369] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3458 (VGAM3458) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48370] VGAM3458 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3458 was detected is described hereinabove with reference to Figs. 2–8.

[48371] VGAM3458 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3458 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48372] VGAM3458 gene, herein designated VGAM GENE, encodes a VGAM3458 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3458 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3458 precursor RNA is designated SEQ ID:77647, and is provided hereinbelow with reference to the sequence listing part.

[48373] VGAM3458 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3458 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48374] An enzyme complex designated DICER COMPLEX, dices the VGAM3458 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3458 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3458 RNA is designated SEQ ID:77648,

and is provided hereinbelow with reference to the sequence listing part.

[48375] VGAM3458 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3458 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3458 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48376] VGAM3458 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3458 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3458 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3458 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3458 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48377] The complementary binding of VGAM3458 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3458 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3458 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3458 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48378] It is appreciated that VGAM3458 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3458 host target genes. The mRNA of each one of this plurality of VGAM3458 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3458 RNA, herein designated VGAM RNA, and which when bound by VGAM3458 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3458 host target proteins.

[48379] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3458 gene, herein designated VGAM GENE, on one or more VGAM3458 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48380] It is yet further appreciated that a function of VGAM3458 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3458 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3458 correlate with, and may be deduced from, the identity of the host target genes which VGAM3458 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48381] Nucleotide sequences of the VGAM3458 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3458 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3458 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3458 are further described hereinbelow with reference to Table 1.

[48382] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3458 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48383] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3459 (VGAM3459) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48384] VGAM3459 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3459 was detected is described hereinabove with reference to Figs. 2–8.

[48385] VGAM3459 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3459 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48386] VGAM3459 gene, herein designated VGAM GENE, encodes a VGAM3459 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3459 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3459 precu-

sor RNA is designated SEQ ID:77661, and is provided hereinbelow with reference to the sequence listing part.

[48387] VGAM3459 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3459 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48388] An enzyme complex designated DICER COMPLEX, dices the VGAM3459 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3459 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3459 RNA is designated SEQ ID:77662, and is provided hereinbelow with reference to the se-

quence listing part.

[48389] VGAM3459 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3459 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3459 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48390] VGAM3459 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3459 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3459 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3459 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3459 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48391] The complementary binding of VGAM3459 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3459 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3459 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3459 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48392] It is appreciated that VGAM3459 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3459 host target genes. The mRNA of each one of this plurality of VGAM3459 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3459 RNA, herein designated VGAM RNA, and which when bound by VGAM3459 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3459 host target proteins.

[48393] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3459 gene, herein designated VGAM GENE, on one or more VGAM3459 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48394] It is yet further appreciated that a function of VGAM3459

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3459 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3459 correlate with, and may be deduced from, the identity of the host target genes which VGAM3459 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48395] Nucleotide sequences of the VGAM3459 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3459 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3459 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3459 are further described hereinbelow with reference to Table 1.

[48396] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3459 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48397] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3460 (VGAM3460) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48398] VGAM3460 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3460 was detected is described hereinabove with reference to Figs. 2–8.

[48399] VGAM3460 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3460 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48400] VGAM3460 gene, herein designated VGAM GENE, encodes a VGAM3460 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3460 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3460 precursor RNA is designated SEQ ID:77756, and is provided

hereinbelow with reference to the sequence listing part.

[48401] VGAM3460 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3460 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48402] An enzyme complex designated DICER COMPLEX, dices the VGAM3460 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3460 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3460 RNA is designated SEQ ID:77757, and is provided hereinbelow with reference to the sequence listing part.

[48403] VGAM3460 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3460 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3460 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48404] VGAM3460 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3460 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3460 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3460 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3460 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48405] The complementary binding of VGAM3460 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3460 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3460 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3460 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48406] It is appreciated that VGAM3460 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3460 host target genes. The mRNA of each one of this plurality of VGAM3460 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3460 RNA, herein designated VGAM RNA, and which when bound by VGAM3460 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3460 host target proteins.

[48407] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3460 gene, herein designated VGAM GENE, on one or more VGAM3460 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48408] It is yet further appreciated that a function of VGAM3460 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3460 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3460 correlate with, and may be deduced from, the identity of the host target genes which VGAM3460 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48409] Nucleotide sequences of the VGAM3460 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3460 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3460 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3460 are further described hereinbelow with reference to Table 1.

[48410] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3460 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48411] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3461 (VGAM3461) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48412] VGAM3461 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3461 was detected is described hereinabove with reference to Figs. 2–8.

[48413] VGAM3461 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice yellow stunt virus. VGAM3461 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48414] VGAM3461 gene, herein designated VGAM GENE, encodes a VGAM3461 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3461 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3461 precursor RNA is designated SEQ ID:77799, and is provided hereinbelow with reference to the sequence listing part.

[48415] VGAM3461 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3461 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48416] An enzyme complex designated DICER COMPLEX, dices the VGAM3461 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3461 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3461 RNA is designated SEQ ID:77800, and is provided hereinbelow with reference to the sequence listing part.

[48417] VGAM3461 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3461 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3461 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48418] VGAM3461 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3461 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3461 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3461 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3461 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48419] The complementary binding of VGAM3461 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3461 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3461 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3461 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48420] It is appreciated that VGAM3461 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3461 host target genes. The mRNA of each one of this plurality of VGAM3461 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3461 RNA, herein designated VGAM

RNA, and which when bound by VGAM3461 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3461 host target proteins.

[48421] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3461 gene, herein designated VGAM GENE, on one or more VGAM3461 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48422] It is yet further appreciated that a function of VGAM3461 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3461 include diagnosis, prevention and treatment of viral infection by Rice yellow stunt virus. Specific functions, and accordingly utilities, of VGAM3461 correlate with, and may be deduced from, the identity of the host target genes which VGAM3461 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48423] Nucleotide sequences of the VGAM3461 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3461 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3461 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3461 are further described hereinbelow with reference to Table 1.

[48424] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3461 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48425] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3462 (VGAM3462) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48426] VGAM3462 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3462 was detected is described hereinabove with reference to Figs. 2–8.

[48427] VGAM3462 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice yellow stunt virus. VGAM3462 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48428] VGAM3462 gene, herein designated VGAM GENE, encodes a VGAM3462 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3462 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3462 precursor RNA is designated SEQ ID:77818, and is provided hereinbelow with reference to the sequence listing part.

[48429] VGAM3462 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3462 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48430] An enzyme complex designated DICER COMPLEX, dices the VGAM3462 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3462 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3462 RNA is designated SEQ ID:77819, and is provided hereinbelow with reference to the sequence listing part.

[48431] VGAM3462 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3462 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3462 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48432] VGAM3462 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3462 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3462 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3462 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3462 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48433] The complementary binding of VGAM3462 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3462 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3462 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3462 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48434] It is appreciated that VGAM3462 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3462 host target genes. The mRNA of each one of this plurality of VGAM3462 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3462 RNA, herein designated VGAM RNA, and which when bound by VGAM3462 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3462 host target proteins.

[48435] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3462 gene, herein designated VGAM GENE, on one or more VGAM3462 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48436] It is yet further appreciated that a function of VGAM3462 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3462 include diagnosis, prevention and

treatment of viral infection by Rice yellow stunt virus. Specific functions, and accordingly utilities, of VGAM3462 correlate with, and may be deduced from, the identity of the host target genes which VGAM3462 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48437] Nucleotide sequences of the VGAM3462 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3462 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3462 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3462 are further described hereinbelow with reference to Table 1.

[48438] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3462 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48439] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3463 (VGAM3463) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48440] VGAM3463 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3463 was detected is described hereinabove with reference to Figs. 2–8.

[48441] VGAM3463 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice yellow stunt virus. VGAM3463 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48442] VGAM3463 gene, herein designated VGAM GENE, encodes a VGAM3463 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3463 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3463 precursor RNA is designated SEQ ID:77936, and is provided hereinbelow with reference to the sequence listing part.

[48443] VGAM3463 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3463 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48444] An enzyme complex designated DICER COMPLEX, dices the VGAM3463 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3463 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3463 RNA is designated SEQ ID:77937, and is provided hereinbelow with reference to the sequence listing part.

[48445] VGAM3463 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3463 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3463 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48446] VGAM3463 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3463 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3463 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3463 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3463 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48447] The complementary binding of VGAM3463 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3463 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3463 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3463 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48448] It is appreciated that VGAM3463 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3463 host target genes. The mRNA of each one of this plurality of VGAM3463 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3463 RNA, herein designated VGAM RNA, and which when bound by VGAM3463 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3463 host target proteins.

[48449] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3463 gene, herein designated VGAM GENE, on one or more VGAM3463 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48450] It is yet further appreciated that a function of VGAM3463 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3463 include diagnosis, prevention and treatment of viral infection by Rice yellow stunt virus. Spe-

cific functions, and accordingly utilities, of VGAM3463 correlate with, and may be deduced from, the identity of the host target genes which VGAM3463 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48451] Nucleotide sequences of the VGAM3463 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3463 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3463 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3463 are further described hereinbelow with reference to Table 1.

[48452] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3463 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48453] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3464 (VGAM3464) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[48454] VGAM3464 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3464 was detected is described hereinabove with reference to Figs. 2–8.

[48455] VGAM3464 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Myxoma virus. VGAM3464 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48456] VGAM3464 gene, herein designated VGAM GENE, encodes a VGAM3464 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3464 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3464 precursor RNA is designated SEQ ID:78090, and is provided hereinbelow with reference to the sequence listing part.

[48457] VGAM3464 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3464 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48458] An enzyme complex designated DICER COMPLEX, dices the VGAM3464 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3464 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3464 RNA is designated SEQ ID:78091, and is provided hereinbelow with reference to the sequence listing part.

[48459] VGAM3464 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3464 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3464 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48460] VGAM3464 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3464 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3464 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3464 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3464 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48461] The complementary binding of VGAM3464 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3464 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3464 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3464 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48462] It is appreciated that VGAM3464 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3464 host target genes. The mRNA of each one of this plurality of VGAM3464 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3464 RNA, herein designated VGAM RNA, and which when bound by VGAM3464 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3464 host target proteins.

[48463] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3464 gene, herein designated VGAM GENE, on one or more VGAM3464 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48464] It is yet further appreciated that a function of VGAM3464 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3464 include diagnosis, prevention and treatment of viral infection by Myxoma virus. Specific functions, and accordingly utilities, of VGAM3464 corre-

late with, and may be deduced from, the identity of the host target genes which VGAM3464 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48465] Nucleotide sequences of the VGAM3464 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3464 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3464 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3464 are further described hereinbelow with reference to Table 1.

[48466] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3464 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48467] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3465 (VGAM3465) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[48468] VGAM3465 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3465 was detected is described hereinabove with reference to Figs. 2–8.

[48469] VGAM3465 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3465 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48470] VGAM3465 gene, herein designated VGAM GENE, encodes a VGAM3465 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3465 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3465 precursor RNA is designated SEQ ID:78119, and is provided hereinbelow with reference to the sequence listing part.

[48471] VGAM3465 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3465 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48472] An enzyme complex designated DICER COMPLEX, dices the VGAM3465 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3465 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3465 RNA is designated SEQ ID:78120, and is provided hereinbelow with reference to the sequence listing part.

[48473] VGAM3465 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3465 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3465 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48474] VGAM3465 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3465 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3465 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3465 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3465 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48475] The complementary binding of VGAM3465 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3465 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3465 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3465 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48476] It is appreciated that VGAM3465 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3465 host target genes. The mRNA of each one of this plurality of VGAM3465 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3465 RNA, herein designated VGAM RNA, and which when bound by VGAM3465 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3465 host target proteins.

[48477] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3465 gene, herein designated VGAM GENE, on one or more VGAM3465 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48478] It is yet further appreciated that a function of VGAM3465 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3465 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3465 correlate with, and may be deduced from, the

identity of the host target genes which VGAM3465 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48479] Nucleotide sequences of the VGAM3465 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3465 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3465 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3465 are further described hereinbelow with reference to Table 1.

[48480] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3465 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48481] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3466 (VGAM3466) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48482] VGAM3466 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3466 was detected is described hereinabove with reference to Figs. 2–8.

[48483] VGAM3466 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 49. VGAM3466 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48484] VGAM3466 gene, herein designated VGAM GENE, encodes a VGAM3466 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3466 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3466 precursor RNA is designated SEQ ID:78125, and is provided hereinbelow with reference to the sequence listing part.

[48485] VGAM3466 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3466 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48486] An enzyme complex designated DICER COMPLEX, dices the VGAM3466 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3466 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3466 RNA is designated SEQ ID:78126, and is provided hereinbelow with reference to the sequence listing part.

[48487] VGAM3466 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3466 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3466 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48488] VGAM3466 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3466 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3466 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3466 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3466 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48489] The complementary binding of VGAM3466 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3466 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3466 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3466 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48490] It is appreciated that VGAM3466 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3466 host target genes. The mRNA of each one of this plurality of VGAM3466 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3466 RNA, herein designated VGAM RNA, and which when bound by VGAM3466 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3466 host target proteins.

[48491] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3466 gene, herein designated VGAM GENE, on one or more VGAM3466 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48492] It is yet further appreciated that a function of VGAM3466 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3466 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 49. Specific functions, and accordingly utilities, of VGAM3466 correlate with, and may be deduced from, the identity of the host target genes which VGAM3466 binds

and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48493] Nucleotide sequences of the VGAM3466 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3466 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3466 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3466 are further described hereinbelow with reference to Table 1.

[48494] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3466 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48495] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3467 (VGAM3467) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48496] VGAM3467 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3467 was detected is described hereinabove with reference to Figs. 2–8.

[48497] VGAM3467 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 49. VGAM3467 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48498] VGAM3467 gene, herein designated VGAM GENE, encodes a VGAM3467 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3467 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3467 precursor RNA is designated SEQ ID:78130, and is provided hereinbelow with reference to the sequence listing part.

[48499] VGAM3467 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3467 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48500] An enzyme complex designated DICER COMPLEX, dices the VGAM3467 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3467 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3467 RNA is designated SEQ ID:78131, and is provided hereinbelow with reference to the sequence listing part.

[48501] VGAM3467 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3467 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3467 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48502] VGAM3467 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3467 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3467 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3467 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3467 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3'UTR and 5'UTR regions.

[48503] The complementary binding of VGAM3467 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3467 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3467 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3467 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48504] It is appreciated that VGAM3467 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3467 host target genes. The mRNA of each one of this plurality of VGAM3467 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3467 RNA, herein designated VGAM RNA, and which when bound by VGAM3467 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3467 host target proteins.

[48505] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3467 gene, herein designated VGAM GENE, on one or more VGAM3467 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48506] It is yet further appreciated that a function of VGAM3467 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3467 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 49. Specific functions, and accordingly utilities, of VGAM3467 correlate with, and may be deduced from, the identity of the host target genes which VGAM3467 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[48507] Nucleotide sequences of the VGAM3467 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3467 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3467 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3467 are further described hereinbelow with reference to Table 1.

[48508] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3467 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48509] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3468 (VGAM3468) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48510] VGAM3468 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3468 was detected is described hereinabove with reference to Figs. 2–8.

[48511] VGAM3468 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Respiratory syncytial virus. VGAM3468 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48512] VGAM3468 gene, herein designated VGAM GENE, encodes a VGAM3468 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3468 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3468 precursor RNA is designated SEQ ID:78149, and is provided hereinbelow with reference to the sequence listing part.

[48513] VGAM3468 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3468 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48514] An enzyme complex designated DICER COMPLEX, dices the VGAM3468 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3468 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3468 RNA is designated SEQ ID:78150, and is provided hereinbelow with reference to the sequence listing part.

[48515] VGAM3468 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3468 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3468 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[48516] VGAM3468 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3468 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3468 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3468 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3468 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48517] The complementary binding of VGAM3468 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3468 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3468 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3468 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48518] It is appreciated that VGAM3468 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3468 host target genes. The mRNA of each one of this plurality of VGAM3468 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3468 RNA, herein designated VGAM RNA, and which when bound by VGAM3468 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3468 host target proteins.

[48519] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3468 gene, herein designated VGAM GENE, on one

or more VGAM3468 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48520] It is yet further appreciated that a function of VGAM3468 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3468 include diagnosis, prevention and treatment of viral infection by Respiratory syncytial virus. Specific functions, and accordingly utilities, of VGAM3468 correlate with, and may be deduced from, the identity of the host target genes which VGAM3468 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48521] Nucleotide sequences of the VGAM3468 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3468 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3468 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3468 are further described hereinbelow with reference to Table 1.

[48522] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3468 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48523] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3469 (VGAM3469) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48524] VGAM3469 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3469 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[48525] VGAM3469 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus.

VGAM3469 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48526] VGAM3469 gene, herein designated VGAM GENE, encodes a VGAM3469 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3469 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3469 precursor RNA is designated SEQ ID:78152, and is provided hereinbelow with reference to the sequence listing part.

[48527] VGAM3469 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3469 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48528] An enzyme complex designated DICER COMPLEX, dices the VGAM3469 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3469 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3469 RNA is designated SEQ ID:78153, and is provided hereinbelow with reference to the sequence listing part.

[48529] VGAM3469 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3469 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3469 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48530] VGAM3469 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3469 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3469 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3469 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3469 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48531] The complementary binding of VGAM3469 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3469 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3469 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3469 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48532] It is appreciated that VGAM3469 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3469 host target genes. The mRNA of each one of this plurality of VGAM3469 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3469 RNA, herein designated VGAM RNA, and which when bound by VGAM3469 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3469 host target proteins.

[48533] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3469 gene, herein designated VGAM GENE, on one or more VGAM3469 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48534] It is yet further appreciated that a function of VGAM3469 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3469 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3469 correlate with, and may be deduced from, the identity of the host target genes which VGAM3469 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48535] Nucleotide sequences of the VGAM3469 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3469 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3469 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3469 are further described hereinbelow with reference to Table 1.

[48536] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3469 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48537] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3470 (VGAM3470) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48538] VGAM3470 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3470 was detected is described hereinabove with reference to Figs. 2-8.

[48539] VGAM3470 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine polyomavirus. VGAM3470 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48540] VGAM3470 gene, herein designated VGAM GENE, encodes a VGAM3470 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3470 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3470 precursor RNA is designated SEQ ID:78182, and is provided hereinbelow with reference to the sequence listing part.

[48541] VGAM3470 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3470 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[48542] An enzyme complex designated DICER COMPLEX, dices the VGAM3470 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3470 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3470 RNA is designated SEQ ID:78183, and is provided hereinbelow with reference to the sequence listing part.

[48543] VGAM3470 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3470 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3470 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48544] VGAM3470 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3470 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3470 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3470 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3470 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48545] The complementary binding of VGAM3470 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3470 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3470 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3470 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48546] It is appreciated that VGAM3470 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3470 host target genes. The mRNA of each one of this plurality of VGAM3470 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3470 RNA, herein designated VGAM RNA, and which when bound by VGAM3470 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3470 host target proteins.

[48547] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3470 gene, herein designated VGAM GENE, on one or more VGAM3470 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48548] It is yet further appreciated that a function of VGAM3470 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3470 include diagnosis, prevention and treatment of viral infection by Bovine polyomavirus. Specific functions, and accordingly utilities, of VGAM3470 correlate with, and may be deduced from, the identity of the host target genes which VGAM3470 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48549] Nucleotide sequences of the VGAM3470 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3470 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3470 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3470 are further described hereinbelow with reference to Table 1.

[48550] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3470 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48551] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3471 (VGAM3471) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48552] VGAM3471 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3471 was detected is described hereinabove with reference to Figs. 2-8.

[48553] VGAM3471 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Human herpesvirus 1. VGAM3471 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48554] VGAM3471 gene, herein designated VGAM GENE, encodes a VGAM3471 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3471 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3471 precursor RNA is designated SEQ ID:78229, and is provided hereinbelow with reference to the sequence listing part.

[48555] VGAM3471 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3471 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48556] An enzyme complex designated DICER COMPLEX, dices the VGAM3471 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3471 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3471 RNA is designated SEQ ID:78230, and is provided hereinbelow with reference to the sequence listing part.

[48557] VGAM3471 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3471 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3471 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48558] VGAM3471 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3471 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3471 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3471 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3471 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48559] The complementary binding of VGAM3471 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3471 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3471 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3471 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48560] It is appreciated that VGAM3471 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3471 host target genes. The mRNA of each one of this plurality of VGAM3471 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3471 RNA, herein designated VGAM RNA, and which when bound by VGAM3471 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3471 host target proteins.

[48561] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3471 gene, herein designated VGAM GENE, on one or more VGAM3471 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48562] It is yet further appreciated that a function of VGAM3471 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3471 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3471 correlate with, and may be deduced from, the identity of the host target genes which VGAM3471 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48563] Nucleotide sequences of the VGAM3471 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3471 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3471 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3471 are further described hereinbelow with reference to Table 1.

[48564] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3471 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48565] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3472 (VGAM3472) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48566] VGAM3472 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3472 was detected is described hereinabove with reference to Figs. 2-8.

[48567] VGAM3472 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2.

VGAM3472 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48568] VGAM3472 gene, herein designated VGAM GENE, encodes a VGAM3472 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3472 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3472 precursor RNA is designated SEQ ID:78875, and is provided hereinbelow with reference to the sequence listing part.

[48569] VGAM3472 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3472 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48570] An enzyme complex designated DICER COMPLEX, dices

the VGAM3472 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3472 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3472 RNA is designated SEQ ID:78876, and is provided hereinbelow with reference to the sequence listing part.

[48571] VGAM3472 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3472 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3472 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48572] VGAM3472 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3472 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3472 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3472 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3472 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48573] The complementary binding of VGAM3472 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3472 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3472 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3472 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48574] It is appreciated that VGAM3472 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3472 host target genes. The mRNA of each one of this plurality of VGAM3472 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3472 RNA, herein designated VGAM RNA, and which when bound by VGAM3472 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3472 host target proteins.

[48575] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3472 gene, herein designated VGAM GENE, on one or more VGAM3472 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48576] It is yet further appreciated that a function of VGAM3472 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3472 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3472 correlate with, and may be deduced from, the identity of the host target genes which VGAM3472 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48577] Nucleotide sequences of the VGAM3472 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3472 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3472 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3472 are further described hereinbelow with reference to Table 1.

[48578] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3472 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48579] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3473 (VGAM3473) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48580] VGAM3473 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3473 was detected is described hereinabove with reference to Figs. 2-8.

[48581] VGAM3473 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3. VGAM3473 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[48582] VGAM3473 gene, herein designated VGAM GENE, encodes a VGAM3473 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3473 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3473 precursor RNA is designated SEQ ID:78883, and is provided hereinbelow with reference to the sequence listing part.

[48583] VGAM3473 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3473 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48584] An enzyme complex designated DICER COMPLEX, dices the VGAM3473 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3473 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3473 RNA is designated SEQ ID:78884, and is provided hereinbelow with reference to the sequence listing part.

[48585] VGAM3473 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3473 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3473 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48586] VGAM3473 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3473 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3473 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3473 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3473 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48587] The complementary binding of VGAM3473 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3473 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3473

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3473 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48588] It is appreciated that VGAM3473 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3473 host target genes. The mRNA of each one of this plurality of VGAM3473 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3473 RNA, herein designated VGAM RNA, and which when bound by VGAM3473 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3473 host target proteins.

[48589] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3473 gene, herein designated VGAM GENE, on one or more VGAM3473 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48590] It is yet further appreciated that a function of VGAM3473 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3473 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3473 correlate with, and may be deduced from, the identity of the host target genes which VGAM3473 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48591] Nucleotide sequences of the VGAM3473 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3473 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3473 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3473 are further described hereinbelow with reference to Table 1.

[48592] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3473 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48593] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3474 (VGAM3474) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48594] VGAM3474 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3474 was detected is described hereinabove with reference to Figs. 2-8.

[48595] VGAM3474 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3474 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene

contained in the human genome.

[48596] VGAM3474 gene, herein designated VGAM GENE, encodes a VGAM3474 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3474 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3474 precursor RNA is designated SEQ ID:78915, and is provided hereinbelow with reference to the sequence listing part.

[48597] VGAM3474 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3474 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48598] An enzyme complex designated DICER COMPLEX, dices the VGAM3474 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3474 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3474 RNA is designated SEQ ID:78916, and is provided hereinbelow with reference to the sequence listing part.

[48599] VGAM3474 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3474 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3474 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48600] VGAM3474 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3474 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3474 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3474 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3474 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48601] The complementary binding of VGAM3474 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3474 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3474 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3474 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48602] It is appreciated that VGAM3474 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3474 host target genes. The mRNA of each one of this plurality of VGAM3474 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3474 RNA, herein designated VGAM RNA, and which when bound by VGAM3474 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3474 host target proteins.

[48603] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3474 gene, herein designated VGAM GENE, on one or more VGAM3474 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48604] It is yet further appreciated that a function of VGAM3474 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3474 include diagnosis, prevention and treatment of viral infection by *Melanoplus sanguinipes* entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3474 correlate with, and may be deduced from, the identity of the host target genes which VGAM3474 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48605] Nucleotide sequences of the VGAM3474 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3474 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3474 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3474 are further

described hereinbelow with reference to Table 1.

[48606] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3474 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48607] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3475 (VGAM3475) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48608] VGAM3475 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3475 was detected is described hereinabove with reference to Figs. 2-8.

[48609] VGAM3475 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3475 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48610] VGAM3475 gene, herein designated VGAM GENE, encodes a VGAM3475 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3475 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3475 precursor RNA is designated SEQ ID:78920, and is provided hereinbelow with reference to the sequence listing part.

[48611] VGAM3475 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3475 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48612] An enzyme complex designated DICER COMPLEX, dices the VGAM3475 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3475 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3475 RNA is designated SEQ ID:78921, and is provided hereinbelow with reference to the sequence listing part.

[48613] VGAM3475 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3475 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3475 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48614] VGAM3475 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3475 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3475 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3475 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3475 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48615] The complementary binding of VGAM3475 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3475 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3475 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3475 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48616] It is appreciated that VGAM3475 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3475 host target genes. The mRNA of each one of this plurality of VGAM3475 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3475 RNA, herein designated VGAM RNA, and which when bound by VGAM3475 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3475 host target proteins.

[48617] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3475 gene, herein designated VGAM GENE, on one or more VGAM3475 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48618] It is yet further appreciated that a function of VGAM3475 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3475 include diagnosis, prevention and treatment of viral infection by *Melanoplus sanguinipes* entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3475 correlate with, and may be deduced from, the identity of the host target genes which VGAM3475 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48619] Nucleotide sequences of the VGAM3475 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3475 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3475 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3475 are further described hereinbelow with reference to Table 1.

[48620] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3475 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48621] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3476 (VGAM3476) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48622] VGAM3476 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3476 was detected is described hereinabove with reference to Figs. 2-8.

[48623] VGAM3476 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Porcine epidemic diarrhea virus. VGAM3476 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48624] VGAM3476 gene, herein designated VGAM GENE, encodes

a VGAM3476 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3476 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3476 precursor RNA is designated SEQ ID:78934, and is provided hereinbelow with reference to the sequence listing part.

[48625] VGAM3476 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3476 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48626] An enzyme complex designated DICER COMPLEX, dices the VGAM3476 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3476 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3476 RNA is designated SEQ ID:78935, and is provided hereinbelow with reference to the sequence listing part.

[48627] VGAM3476 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3476 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3476 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48628] VGAM3476 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3476 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3476 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3476 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3476 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48629] The complementary binding of VGAM3476 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3476 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3476 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3476 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[48630] It is appreciated that VGAM3476 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3476 host target genes. The mRNA of each one of this plurality of VGAM3476 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3476 RNA, herein designated VGAM RNA, and which when bound by VGAM3476 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3476 host target proteins.

[48631] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3476 gene, herein designated VGAM GENE, on one or more VGAM3476 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48632] It is yet further appreciated that a function of VGAM3476 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3476 include diagnosis, prevention and treatment of viral infection by Porcine epidemic diarrhea virus. Specific functions, and accordingly utilities, of VGAM3476 correlate with, and may be deduced from, the identity of the host target genes which VGAM3476 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48633] Nucleotide sequences of the VGAM3476 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3476 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3476 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3476 are further described hereinbelow with reference to Table 1.

[48634] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3476 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48635] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3477 (VGAM3477) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48636] VGAM3477 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3477 was detected is described hereinabove with reference to Figs. 2-8.

[48637] VGAM3477 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Plum pox virus. VGAM3477 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48638] VGAM3477 gene, herein designated VGAM GENE, encodes a VGAM3477 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3477 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3477 precursor RNA is designated SEQ ID:78940, and is provided hereinbelow with reference to the sequence listing part.

[48639] VGAM3477 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3477 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48640] An enzyme complex designated DICER COMPLEX, dices the VGAM3477 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3477 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3477 RNA is designated SEQ ID:78941, and is provided hereinbelow with reference to the sequence listing part.

[48641] VGAM3477 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3477 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3477 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48642] VGAM3477 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3477 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3477 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3477 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3477 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48643] The complementary binding of VGAM3477 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3477 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3477 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3477 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48644] It is appreciated that VGAM3477 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3477 host target genes. The mRNA of each one of this plurality of VGAM3477 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3477 RNA, herein designated VGAM RNA, and which when bound by VGAM3477 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3477 host target proteins.

[48645] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3477 gene, herein designated VGAM GENE, on one or more VGAM3477 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48646] It is yet further appreciated that a function of VGAM3477 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3477 include diagnosis, prevention and treatment of viral infection by Plum pox virus. Specific functions, and accordingly utilities, of VGAM3477 correlate with, and may be deduced from, the identity of the host target genes which VGAM3477 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48647] Nucleotide sequences of the VGAM3477 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3477 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3477 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3477 are further described hereinbelow with reference to Table 1.

[48648] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3477 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48649] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3478 (VGAM3478) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48650] VGAM3478 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3478 was detected is described hereinabove with reference to Figs. 2-8.

[48651] VGAM3478 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Plum pox virus.

VGAM3478 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48652] VGAM3478 gene, herein designated VGAM GENE, encodes a VGAM3478 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3478 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3478 precursor RNA is designated SEQ ID:78958, and is provided hereinbelow with reference to the sequence listing part.

[48653] VGAM3478 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3478 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48654] An enzyme complex designated DICER COMPLEX, dices the VGAM3478 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3478 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3478 RNA is designated SEQ ID:78959, and is provided hereinbelow with reference to the sequence listing part.

[48655] VGAM3478 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3478 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3478 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48656] VGAM3478 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3478 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3478 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3478 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3478 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48657] The complementary binding of VGAM3478 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3478 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3478 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3478 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48658] It is appreciated that VGAM3478 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3478 host target genes. The mRNA of each one of this plurality of VGAM3478 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3478 RNA, herein designated VGAM RNA, and which when bound by VGAM3478 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3478 host target proteins.

[48659] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3478 gene, herein designated VGAM GENE, on one or more VGAM3478 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48660] It is yet further appreciated that a function of VGAM3478 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3478 include diagnosis, prevention and treatment of viral infection by Plum pox virus. Specific functions, and accordingly utilities, of VGAM3478 correlate with, and may be deduced from, the identity of the host target genes which VGAM3478 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48661] Nucleotide sequences of the VGAM3478 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3478 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3478 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3478 are further described hereinbelow with reference to Table 1.

[48662] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3478 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48663] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3479 (VGAM3479) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48664] VGAM3479 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3479 was detected is described hereinabove with reference to Figs. 2–8.

[48665] VGAM3479 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rabbit fibroma virus. VGAM3479 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48666] VGAM3479 gene, herein designated VGAM GENE, encodes a VGAM3479 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3479 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3479 precursor RNA is designated SEQ ID:78963, and is provided hereinbelow with reference to the sequence listing part.

[48667] VGAM3479 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3479 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48668] An enzyme complex designated DICER COMPLEX, dices the VGAM3479 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3479 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3479 RNA is designated SEQ ID:78964, and is provided hereinbelow with reference to the sequence listing part.

[48669] VGAM3479 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3479 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3479 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48670] VGAM3479 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3479 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3479 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3479 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3479 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48671] The complementary binding of VGAM3479 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3479 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3479 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3479 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48672] It is appreciated that VGAM3479 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3479 host target genes. The mRNA of each one of this plurality of VGAM3479 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3479 RNA, herein designated VGAM RNA, and which when bound by VGAM3479 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3479 host target proteins.

[48673] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3479 gene, herein designated VGAM GENE, on one or more VGAM3479 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [48674] It is yet further appreciated that a function of VGAM3479 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3479 include diagnosis, prevention and treatment of viral infection by Rabbit fibroma virus. Specific functions, and accordingly utilities, of VGAM3479 correlate with, and may be deduced from, the identity of the host target genes which VGAM3479 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [48675] Nucleotide sequences of the VGAM3479 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3479 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3479 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3479 are further described hereinbelow with reference to Table 1.
- [48676] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3479 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48677] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3480 (VGAM3480) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48678] VGAM3480 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3480 was detected is described hereinabove with reference to Figs. 2-8.

[48679] VGAM3480 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rabbit fibroma virus. VGAM3480 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48680] VGAM3480 gene, herein designated VGAM GENE, encodes a VGAM3480 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3480 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3480 precursor RNA is designated SEQ ID:78968, and is provided hereinbelow with reference to the sequence listing part.

[48681] VGAM3480 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3480 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48682] An enzyme complex designated DICER COMPLEX, dices the VGAM3480 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3480 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3480 RNA is designated SEQ ID:78969, and is provided hereinbelow with reference to the sequence listing part.

[48683] VGAM3480 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3480 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3480 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48684] VGAM3480 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3480 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3480 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3480 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3480 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48685] The complementary binding of VGAM3480 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3480 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3480 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3480 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48686] It is appreciated that VGAM3480 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3480 host target genes. The mRNA of

each one of this plurality of VGAM3480 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3480 RNA, herein designated VGAM RNA, and which when bound by VGAM3480 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3480 host target proteins.

[48687] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3480 gene, herein designated VGAM GENE, on one or more VGAM3480 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[48688] It is yet further appreciated that a function of VGAM3480 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3480 include diagnosis, prevention and treatment of viral infection by Rabbit fibroma virus. Specific functions, and accordingly utilities, of VGAM3480 correlate with, and may be deduced from, the identity of the host target genes which VGAM3480 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48689] Nucleotide sequences of the VGAM3480 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3480 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3480 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3480 are further described hereinbelow with reference to Table 1.

[48690] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3480 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[48691] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3481 (VGAM3481) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48692] VGAM3481 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3481 was detected is described hereinabove with reference to Figs. 2–8.

[48693] VGAM3481 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3481 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48694] VGAM3481 gene, herein designated VGAM GENE, encodes a VGAM3481 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3481 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3481 precursor RNA is designated SEQ ID:78986, and is provided hereinbelow with reference to the sequence listing part.

[48695] VGAM3481 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3481 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48696] An enzyme complex designated DICER COMPLEX, dices the VGAM3481 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3481 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3481 RNA is designated SEQ ID:78987,

and is provided hereinbelow with reference to the sequence listing part.

[48697] VGAM3481 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3481 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3481 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48698] VGAM3481 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3481 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3481 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3481 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3481 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48699] The complementary binding of VGAM3481 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3481 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3481 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3481 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48700] It is appreciated that VGAM3481 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3481 host target genes. The mRNA of each one of this plurality of VGAM3481 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3481 RNA, herein designated VGAM RNA, and which when bound by VGAM3481 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3481 host target proteins.

[48701] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3481 gene, herein designated VGAM GENE, on one or more VGAM3481 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48702] It is yet further appreciated that a function of VGAM3481 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3481 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3481 correlate with, and may be deduced from, the identity of the host target genes which VGAM3481 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48703] Nucleotide sequences of the VGAM3481 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3481 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3481 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3481 are further described hereinbelow with reference to Table 1.

[48704] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3481 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48705] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3482 (VGAM3482) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48706] VGAM3482 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3482 was detected is described hereinabove with reference to Figs. 2–8.

[48707] VGAM3482 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3482 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48708] VGAM3482 gene, herein designated VGAM GENE, encodes a VGAM3482 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3482 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3482 precu-

sor RNA is designated SEQ ID:79050, and is provided hereinbelow with reference to the sequence listing part.

[48709] VGAM3482 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3482 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48710] An enzyme complex designated DICER COMPLEX, dices the VGAM3482 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3482 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3482 RNA is designated SEQ ID:79051, and is provided hereinbelow with reference to the se-

quence listing part.

[48711] VGAM3482 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3482 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3482 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48712] VGAM3482 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3482 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3482 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3482 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3482 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48713] The complementary binding of VGAM3482 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3482 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3482 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3482 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48714] It is appreciated that VGAM3482 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3482 host target genes. The mRNA of each one of this plurality of VGAM3482 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3482 RNA, herein designated VGAM RNA, and which when bound by VGAM3482 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3482 host target proteins.

[48715] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3482 gene, herein designated VGAM GENE, on one or more VGAM3482 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48716] It is yet further appreciated that a function of VGAM3482

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3482 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3482 correlate with, and may be deduced from, the identity of the host target genes which VGAM3482 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48717] Nucleotide sequences of the VGAM3482 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3482 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3482 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3482 are further described hereinbelow with reference to Table 1.

[48718] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3482 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48719] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3483 (VGAM3483) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48720] VGAM3483 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3483 was detected is described hereinabove with reference to Figs. 2–8.

[48721] VGAM3483 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3483 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48722] VGAM3483 gene, herein designated VGAM GENE, encodes a VGAM3483 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3483 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3483 precursor RNA is designated SEQ ID:79065, and is provided

hereinbelow with reference to the sequence listing part.

[48723] VGAM3483 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3483 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48724] An enzyme complex designated DICER COMPLEX, dices the VGAM3483 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3483 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3483 RNA is designated SEQ ID:79066, and is provided hereinbelow with reference to the sequence listing part.

[48725] VGAM3483 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3483 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3483 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48726] VGAM3483 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3483 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3483 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3483 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3483 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48727] The complementary binding of VGAM3483 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3483 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3483 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3483 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48728] It is appreciated that VGAM3483 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3483 host target genes. The mRNA of each one of this plurality of VGAM3483 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3483 RNA, herein designated VGAM RNA, and which when bound by VGAM3483 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3483 host target proteins.

[48729] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3483 gene, herein designated VGAM GENE, on one or more VGAM3483 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48730] It is yet further appreciated that a function of VGAM3483 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3483 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3483 correlate with, and may be deduced from, the identity of the host target genes which VGAM3483 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48731] Nucleotide sequences of the VGAM3483 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3483 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3483 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3483 are further described hereinbelow with reference to Table 1.

[48732] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3483 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48733] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3484 (VGAM3484) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48734] VGAM3484 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3484 was detected is described hereinabove with reference to Figs. 2–8.

[48735] VGAM3484 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3484 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48736] VGAM3484 gene, herein designated VGAM GENE, encodes a VGAM3484 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3484 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3484 precursor RNA is designated SEQ ID:79073, and is provided hereinbelow with reference to the sequence listing part.

[48737] VGAM3484 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3484 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48738] An enzyme complex designated DICER COMPLEX, dices the VGAM3484 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3484 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3484 RNA is designated SEQ ID:79074, and is provided hereinbelow with reference to the sequence listing part.

[48739] VGAM3484 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3484 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3484 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48740] VGAM3484 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3484 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3484 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3484 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3484 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48741] The complementary binding of VGAM3484 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3484 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3484 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3484 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48742] It is appreciated that VGAM3484 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3484 host target genes. The mRNA of each one of this plurality of VGAM3484 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3484 RNA, herein designated VGAM

RNA, and which when bound by VGAM3484 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3484 host target proteins.

[48743] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3484 gene, herein designated VGAM GENE, on one or more VGAM3484 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48744] It is yet further appreciated that a function of VGAM3484 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3484 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3484 correlate with, and may be deduced from, the identity of the host target genes which VGAM3484 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48745] Nucleotide sequences of the VGAM3484 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3484 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3484 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3484 are further described hereinbelow with reference to Table 1.

[48746] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3484 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48747] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3485 (VGAM3485) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48748] VGAM3485 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3485 was detected is described hereinabove with reference to Figs. 2-8.

[48749] VGAM3485 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2. VGAM3485 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48750] VGAM3485 gene, herein designated VGAM GENE, encodes a VGAM3485 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3485 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3485 precursor RNA is designated SEQ ID:79087, and is provided hereinbelow with reference to the sequence listing part.

[48751] VGAM3485 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3485 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48752] An enzyme complex designated DICER COMPLEX, dices the VGAM3485 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3485 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3485 RNA is designated SEQ ID:79088, and is provided hereinbelow with reference to the sequence listing part.

[48753] VGAM3485 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3485 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3485 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48754] VGAM3485 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3485 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3485 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3485 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3485 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48755] The complementary binding of VGAM3485 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3485 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3485 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3485 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48756] It is appreciated that VGAM3485 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3485 host target genes. The mRNA of each one of this plurality of VGAM3485 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3485 RNA, herein designated VGAM RNA, and which when bound by VGAM3485 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3485 host target proteins.

[48757] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3485 gene, herein designated VGAM GENE, on one or more VGAM3485 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48758] It is yet further appreciated that a function of VGAM3485 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3485 include diagnosis, prevention and

treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3485 correlate with, and may be deduced from, the identity of the host target genes which VGAM3485 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48759] Nucleotide sequences of the VGAM3485 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3485 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3485 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3485 are further described hereinbelow with reference to Table 1.

[48760] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3485 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48761] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3486 (VGAM3486) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48762] VGAM3486 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3486 was detected is described hereinabove with reference to Figs. 2–8.

[48763] VGAM3486 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Porcine adenovirus A. VGAM3486 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48764] VGAM3486 gene, herein designated VGAM GENE, encodes a VGAM3486 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3486 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3486 precursor RNA is designated SEQ ID:79105, and is provided hereinbelow with reference to the sequence listing part.

[48765] VGAM3486 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3486 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48766] An enzyme complex designated DICER COMPLEX, dices the VGAM3486 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3486 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3486 RNA is designated SEQ ID:79106, and is provided hereinbelow with reference to the sequence listing part.

[48767] VGAM3486 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3486 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3486 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48768] VGAM3486 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3486 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3486 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3486 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3486 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48769] The complementary binding of VGAM3486 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3486 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3486 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3486 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48770] It is appreciated that VGAM3486 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3486 host target genes. The mRNA of each one of this plurality of VGAM3486 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3486 RNA, herein designated VGAM RNA, and which when bound by VGAM3486 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3486 host target proteins.

[48771] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3486 gene, herein designated VGAM GENE, on one or more VGAM3486 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48772] It is yet further appreciated that a function of VGAM3486 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3486 include diagnosis, prevention and treatment of viral infection by Porcine adenovirus A. Spe-

cific functions, and accordingly utilities, of VGAM3486 correlate with, and may be deduced from, the identity of the host target genes which VGAM3486 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48773] Nucleotide sequences of the VGAM3486 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3486 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3486 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3486 are further described hereinbelow with reference to Table 1.

[48774] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3486 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48775] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3487 (VGAM3487) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[48776] VGAM3487 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3487 was detected is described hereinabove with reference to Figs. 2–8.

[48777] VGAM3487 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3487 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48778] VGAM3487 gene, herein designated VGAM GENE, encodes a VGAM3487 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3487 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3487 precursor RNA is designated SEQ ID:79124, and is provided hereinbelow with reference to the sequence listing part.

[48779] VGAM3487 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3487 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48780] An enzyme complex designated DICER COMPLEX, dices the VGAM3487 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3487 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3487 RNA is designated SEQ ID:79125, and is provided hereinbelow with reference to the sequence listing part.

[48781] VGAM3487 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3487 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3487 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48782] VGAM3487 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3487 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3487 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3487 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3487 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48783] The complementary binding of VGAM3487 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3487 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3487 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3487 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48784] It is appreciated that VGAM3487 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3487 host target genes. The mRNA of each one of this plurality of VGAM3487 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3487 RNA, herein designated VGAM RNA, and which when bound by VGAM3487 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3487 host target proteins.

[48785] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3487 gene, herein designated VGAM GENE, on one or more VGAM3487 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48786] It is yet further appreciated that a function of VGAM3487 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3487 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities,

of VGAM3487 correlate with, and may be deduced from, the identity of the host target genes which VGAM3487 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48787] Nucleotide sequences of the VGAM3487 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3487 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3487 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3487 are further described hereinbelow with reference to Table 1.

[48788] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3487 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48789] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3488 (VGAM3488) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[48790] VGAM3488 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3488 was detected is described hereinabove with reference to Figs. 2–8.

[48791] VGAM3488 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3488 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48792] VGAM3488 gene, herein designated VGAM GENE, encodes a VGAM3488 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3488 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3488 precursor RNA is designated SEQ ID:79132, and is provided hereinbelow with reference to the sequence listing part.

[48793] VGAM3488 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3488 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48794] An enzyme complex designated DICER COMPLEX, dices the VGAM3488 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3488 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3488 RNA is designated SEQ ID:79133, and is provided hereinbelow with reference to the sequence listing part.

[48795] VGAM3488 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3488 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3488 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48796] VGAM3488 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3488 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3488 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3488 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3488 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48797] The complementary binding of VGAM3488 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3488 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3488 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3488 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48798] It is appreciated that VGAM3488 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3488 host target genes. The mRNA of each one of this plurality of VGAM3488 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3488 RNA, herein designated VGAM RNA, and which when bound by VGAM3488 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3488 host target proteins.

[48799] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3488 gene, herein designated VGAM GENE, on one or more VGAM3488 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48800] It is yet further appreciated that a function of VGAM3488 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3488 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3488 correlate with, and may be deduced from,

the identity of the host target genes which VGAM3488 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48801] Nucleotide sequences of the VGAM3488 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3488 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3488 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3488 are further described hereinbelow with reference to Table 1.

[48802] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3488 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48803] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3489 (VGAM3489) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48804] VGAM3489 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3489 was detected is described hereinabove with reference to Figs. 2–8.

[48805] VGAM3489 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3489 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48806] VGAM3489 gene, herein designated VGAM GENE, encodes a VGAM3489 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3489 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3489 precursor RNA is designated SEQ ID:79141, and is provided hereinbelow with reference to the sequence listing part.

[48807] VGAM3489 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3489 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48808] An enzyme complex designated DICER COMPLEX, dices the VGAM3489 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3489 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3489 RNA is designated SEQ ID:79142, and is provided hereinbelow with reference to the sequence listing part.

[48809] VGAM3489 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3489 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3489 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48810] VGAM3489 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3489 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3489 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3489 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3489 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48811] The complementary binding of VGAM3489 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3489 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3489 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3489 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48812] It is appreciated that VGAM3489 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3489 host target genes. The mRNA of each one of this plurality of VGAM3489 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3489 RNA, herein designated VGAM RNA, and which when bound by VGAM3489 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3489 host target proteins.

[48813] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3489 gene, herein designated VGAM GENE, on one or more VGAM3489 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48814] It is yet further appreciated that a function of VGAM3489 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3489 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3489 correlate with, and may be deduced from, the identity of the host target genes which VGAM3489 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[48815] Nucleotide sequences of the VGAM3489 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3489 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3489 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3489 are further described hereinbelow with reference to Table 1.

[48816] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3489 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48817] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3490 (VGAM3490) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48818] VGAM3490 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3490 was detected is described hereinabove with reference to Figs. 2–8.

[48819] VGAM3490 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Zucchini yellow mosaic virus. VGAM3490 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48820] VGAM3490 gene, herein designated VGAM GENE, encodes a VGAM3490 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3490 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3490 precursor RNA is designated SEQ ID:79144, and is provided hereinbelow with reference to the sequence listing part.

[48821] VGAM3490 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3490 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48822] An enzyme complex designated DICER COMPLEX, dices the VGAM3490 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3490 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3490 RNA is designated SEQ ID:79145, and is provided hereinbelow with reference to the sequence listing part.

[48823] VGAM3490 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3490 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3490 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48824] VGAM3490 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3490 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3490 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3490 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3490 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[48825] The complementary binding of VGAM3490 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3490 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3490 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3490 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48826] It is appreciated that VGAM3490 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3490 host target genes. The mRNA of each one of this plurality of VGAM3490 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3490 RNA, herein designated VGAM RNA, and which when bound by VGAM3490 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3490 host target proteins.

[48827] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3490 gene, herein designated VGAM GENE, on one or more VGAM3490 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48828] It is yet further appreciated that a function of VGAM3490 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3490 include diagnosis, prevention and treatment of viral infection by Zucchini yellow mosaic virus. Specific functions, and accordingly utilities, of VGAM3490 correlate with, and may be deduced from, the identity of the host target genes which VGAM3490 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[48829] Nucleotide sequences of the VGAM3490 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3490 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3490 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3490 are further described hereinbelow with reference to Table 1.

[48830] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3490 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48831] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3491 (VGAM3491) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48832] VGAM3491 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3491 was detected is described hereinabove with reference to Figs. 2–8.

[48833] VGAM3491 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 4. VGAM3491 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48834] VGAM3491 gene, herein designated VGAM GENE, encodes a VGAM3491 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3491 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3491 precursor RNA is designated SEQ ID:79150, and is provided hereinbelow with reference to the sequence listing part.

[48835] VGAM3491 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3491 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48836] An enzyme complex designated DICER COMPLEX, dices the VGAM3491 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3491 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3491 RNA is designated SEQ ID:79151, and is provided hereinbelow with reference to the sequence listing part.

[48837] VGAM3491 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3491 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3491 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[48838] VGAM3491 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3491 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3491 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3491 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3491 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48839] The complementary binding of VGAM3491 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3491 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3491 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3491 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48840] It is appreciated that VGAM3491 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3491 host target genes. The mRNA of each one of this plurality of VGAM3491 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3491 RNA, herein designated VGAM RNA, and which when bound by VGAM3491 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3491 host target proteins.

[48841] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3491 gene, herein designated VGAM GENE, on one

or more VGAM3491 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48842] It is yet further appreciated that a function of VGAM3491 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3491 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3491 correlate with, and may be deduced from, the identity of the host target genes which VGAM3491 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48843] Nucleotide sequences of the VGAM3491 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3491 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3491 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3491 are further described hereinbelow with reference to Table 1.

[48844] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3491 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48845] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3492 (VGAM3492) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48846] VGAM3492 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3492 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[48847] VGAM3492 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Turnip mosaic virus.

VGAM3492 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48848] VGAM3492 gene, herein designated VGAM GENE, encodes a VGAM3492 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3492 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3492 precursor RNA is designated SEQ ID:79187, and is provided hereinbelow with reference to the sequence listing part.

[48849] VGAM3492 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3492 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48850] An enzyme complex designated DICER COMPLEX, dices the VGAM3492 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3492 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3492 RNA is designated SEQ ID:79188, and is provided hereinbelow with reference to the sequence listing part.

[48851] VGAM3492 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3492 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3492 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48852] VGAM3492 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3492 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3492 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3492 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3492 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48853] The complementary binding of VGAM3492 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3492 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3492 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3492 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48854] It is appreciated that VGAM3492 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3492 host target genes. The mRNA of each one of this plurality of VGAM3492 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3492 RNA, herein designated VGAM RNA, and which when bound by VGAM3492 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3492 host target proteins.

[48855] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3492 gene, herein designated VGAM GENE, on one or more VGAM3492 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48856] It is yet further appreciated that a function of VGAM3492 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3492 include diagnosis, prevention and treatment of viral infection by Turnip mosaic virus. Specific functions, and accordingly utilities, of VGAM3492 correlate with, and may be deduced from, the identity of the host target genes which VGAM3492 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48857] Nucleotide sequences of the VGAM3492 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3492 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3492 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3492 are further described hereinbelow with reference to Table 1.

[48858] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3492 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48859] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3493 (VGAM3493) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48860] VGAM3493 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3493 was detected is described hereinabove with reference to Figs. 2-8.

[48861] VGAM3493 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine parvovirus.

VGAM3493 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48862] VGAM3493 gene, herein designated VGAM GENE, encodes a VGAM3493 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3493 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3493 precursor RNA is designated SEQ ID:79193, and is provided hereinbelow with reference to the sequence listing part.

[48863] VGAM3493 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3493 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[48864] An enzyme complex designated DICER COMPLEX, dices the VGAM3493 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3493 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3493 RNA is designated SEQ ID:79194, and is provided hereinbelow with reference to the sequence listing part.

[48865] VGAM3493 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3493 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3493 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48866] VGAM3493 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3493 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3493 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3493 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3493 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48867] The complementary binding of VGAM3493 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3493 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3493 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3493 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48868] It is appreciated that VGAM3493 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3493 host target genes. The mRNA of each one of this plurality of VGAM3493 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3493 RNA, herein designated VGAM RNA, and which when bound by VGAM3493 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3493 host target proteins.

[48869] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3493 gene, herein designated VGAM GENE, on one or more VGAM3493 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48870] It is yet further appreciated that a function of VGAM3493 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3493 include diagnosis, prevention and treatment of viral infection by Bovine parvovirus. Specific functions, and accordingly utilities, of VGAM3493 correlate with, and may be deduced from, the identity of the host target genes which VGAM3493 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48871] Nucleotide sequences of the VGAM3493 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3493 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3493 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3493 are further described hereinbelow with reference to Table 1.

[48872] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3493 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48873] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3494 (VGAM3494) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48874] VGAM3494 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3494 was detected is described hereinabove with reference to Figs. 2-8.

[48875] VGAM3494 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Lettuce mosaic virus. VGAM3494 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48876] VGAM3494 gene, herein designated VGAM GENE, encodes a VGAM3494 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3494 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3494 precursor RNA is designated SEQ ID:79198, and is provided hereinbelow with reference to the sequence listing part.

[48877] VGAM3494 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3494 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48878] An enzyme complex designated DICER COMPLEX, dices the VGAM3494 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3494 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3494 RNA is designated SEQ ID:79199, and is provided hereinbelow with reference to the sequence listing part.

[48879] VGAM3494 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3494 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3494 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48880] VGAM3494 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3494 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3494 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3494 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3494 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48881] The complementary binding of VGAM3494 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3494 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3494 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3494 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48882] It is appreciated that VGAM3494 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3494 host target genes. The mRNA of each one of this plurality of VGAM3494 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3494 RNA, herein designated VGAM RNA, and which when bound by VGAM3494 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3494 host target proteins.

[48883] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3494 gene, herein designated VGAM GENE, on one or more VGAM3494 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48884] It is yet further appreciated that a function of VGAM3494 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3494 include diagnosis, prevention and treatment of viral infection by Lettuce mosaic virus. Specific functions, and accordingly utilities, of VGAM3494 correlate with, and may be deduced from, the identity of the host target genes which VGAM3494 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48885] Nucleotide sequences of the VGAM3494 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3494 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3494 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3494 are further described hereinbelow with reference to Table 1.

[48886] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3494 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48887] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3495 (VGAM3495) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48888] VGAM3495 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3495 was detected is described hereinabove with reference to Figs. 2-8.

[48889] VGAM3495 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria

Chlorella virus 1. VGAM3495 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48890] VGAM3495 gene, herein designated VGAM GENE, encodes a VGAM3495 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3495 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3495 precursor RNA is designated SEQ ID:79207, and is provided hereinbelow with reference to the sequence listing part.

[48891] VGAM3495 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3495 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48892] An enzyme complex designated DICER COMPLEX, dices

the VGAM3495 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3495 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3495 RNA is designated SEQ ID:79208, and is provided hereinbelow with reference to the sequence listing part.

[48893] VGAM3495 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3495 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3495 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48894] VGAM3495 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3495 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3495 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3495 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3495 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48895] The complementary binding of VGAM3495 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3495 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3495 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3495 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48896] It is appreciated that VGAM3495 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3495 host target genes. The mRNA of each one of this plurality of VGAM3495 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3495 RNA, herein designated VGAM RNA, and which when bound by VGAM3495 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3495 host target proteins.

[48897] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3495 gene, herein designated VGAM GENE, on one or more VGAM3495 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48898] It is yet further appreciated that a function of VGAM3495 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3495 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3495 correlate with, and may be deduced from, the identity of the host target genes which VGAM3495 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48899] Nucleotide sequences of the VGAM3495 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3495 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3495 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3495 are further described hereinbelow with reference to Table 1.

[48900] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3495 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48901] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3496 (VGAM3496) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48902] VGAM3496 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3496 was detected is described hereinabove with reference to Figs. 2-8.

[48903] VGAM3496 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3496 host target gene, herein

designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48904] VGAM3496 gene, herein designated VGAM GENE, encodes a VGAM3496 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3496 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3496 precursor RNA is designated SEQ ID:79215, and is provided hereinbelow with reference to the sequence listing part.

[48905] VGAM3496 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3496 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48906] An enzyme complex designated DICER COMPLEX, dices the VGAM3496 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3496 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3496 RNA is designated SEQ ID:79216, and is provided hereinbelow with reference to the sequence listing part.

[48907] VGAM3496 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3496 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3496 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48908] VGAM3496 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3496 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3496 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3496 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3496 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48909] The complementary binding of VGAM3496 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3496 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3496

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3496 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48910] It is appreciated that VGAM3496 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3496 host target genes. The mRNA of each one of this plurality of VGAM3496 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3496 RNA, herein designated VGAM RNA, and which when bound by VGAM3496 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3496 host target proteins.

[48911] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3496 gene, herein designated VGAM GENE, on one or more VGAM3496 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48912] It is yet further appreciated that a function of VGAM3496 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3496 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3496 correlate with, and may be deduced from, the identity of the host target genes which VGAM3496 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48913] Nucleotide sequences of the VGAM3496 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3496 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3496 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3496 are further described hereinbelow with reference to Table 1.

[48914] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3496 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48915] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3497 (VGAM3497) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48916] VGAM3497 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3497 was detected is described hereinabove with reference to Figs. 2-8.

[48917] VGAM3497 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Scallion mosaic virus. VGAM3497 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[48918] VGAM3497 gene, herein designated VGAM GENE, encodes a VGAM3497 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3497 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3497 precursor RNA is designated SEQ ID:79233, and is provided hereinbelow with reference to the sequence listing part.

[48919] VGAM3497 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3497 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48920] An enzyme complex designated DICER COMPLEX, dices the VGAM3497 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3497 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3497 RNA is designated SEQ ID:79234, and is provided hereinbelow with reference to the sequence listing part.

[48921] VGAM3497 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3497 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3497 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48922] VGAM3497 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3497 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3497 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3497 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3497 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48923] The complementary binding of VGAM3497 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3497 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3497 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3497 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48924] It is appreciated that VGAM3497 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3497 host target genes. The mRNA of each one of this plurality of VGAM3497 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3497 RNA, herein designated VGAM RNA, and which when bound by VGAM3497 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3497 host target proteins.

[48925] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3497 gene, herein designated VGAM GENE, on one or more VGAM3497 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48926] It is yet further appreciated that a function of VGAM3497 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3497 include diagnosis, prevention and treatment of viral infection by Scallion mosaic virus. Specific functions, and accordingly utilities, of VGAM3497 correlate with, and may be deduced from, the identity of the host target genes which VGAM3497 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48927] Nucleotide sequences of the VGAM3497 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3497 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3497 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3497 are further

described hereinbelow with reference to Table 1.

[48928] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3497 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48929] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3498 (VGAM3498) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48930] VGAM3498 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3498 was detected is described hereinabove with reference to Figs. 2-8.

[48931] VGAM3498 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human adenovirus C. VGAM3498 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48932] VGAM3498 gene, herein designated VGAM GENE, encodes a VGAM3498 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3498 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3498 precursor RNA is designated SEQ ID:79297, and is provided hereinbelow with reference to the sequence listing part.

[48933] VGAM3498 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3498 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[48934] An enzyme complex designated DICER COMPLEX, dices the VGAM3498 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3498 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3498 RNA is designated SEQ ID:79298, and is provided hereinbelow with reference to the sequence listing part.

[48935] VGAM3498 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3498 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3498 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48936] VGAM3498 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3498 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3498 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3498 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3498 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48937] The complementary binding of VGAM3498 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3498 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3498 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3498 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48938] It is appreciated that VGAM3498 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3498 host target genes. The mRNA of each one of this plurality of VGAM3498 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3498 RNA, herein designated VGAM RNA, and which when bound by VGAM3498 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3498 host target proteins.

[48939] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3498 gene, herein designated VGAM GENE, on one or more VGAM3498 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48940] It is yet further appreciated that a function of VGAM3498 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3498 include diagnosis, prevention and treatment of viral infection by Human adenovirus C. Specific functions, and accordingly utilities, of VGAM3498 correlate with, and may be deduced from, the identity of the host target genes which VGAM3498 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48941] Nucleotide sequences of the VGAM3498 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3498 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3498 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3498 are further described hereinbelow with reference to Table 1.

[48942] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3498 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48943] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3499 (VGAM3499) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48944] VGAM3499 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3499 was detected is described hereinabove with reference to Figs. 2-8.

[48945] VGAM3499 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Camelpox virus.

VGAM3499 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48946] VGAM3499 gene, herein designated VGAM GENE, encodes a VGAM3499 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3499 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3499 precursor RNA is designated SEQ ID:79300, and is provided hereinbelow with reference to the sequence listing part.

[48947] VGAM3499 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3499 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48948] An enzyme complex designated DICER COMPLEX, dices the VGAM3499 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3499 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3499 RNA is designated SEQ ID:79301, and is provided hereinbelow with reference to the sequence listing part.

[48949] VGAM3499 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3499 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3499 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48950] VGAM3499 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3499 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3499 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3499 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3499 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48951] The complementary binding of VGAM3499 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3499 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3499 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3499 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48952] It is appreciated that VGAM3499 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3499 host target genes. The mRNA of each one of this plurality of VGAM3499 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3499 RNA, herein designated VGAM RNA, and which when bound by VGAM3499 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3499 host target proteins.

[48953] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3499 gene, herein designated VGAM GENE, on one or more VGAM3499 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48954] It is yet further appreciated that a function of VGAM3499 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3499 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3499 correlate with, and may be deduced from, the identity of the host target genes which VGAM3499 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48955] Nucleotide sequences of the VGAM3499 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3499 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3499 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3499 are further described hereinbelow with reference to Table 1.

[48956] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3499 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48957] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3500 (VGAM3500) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48958] VGAM3500 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3500 was detected is described hereinabove with reference to Figs. 2-8.

[48959] VGAM3500 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus D.

VGAM3500 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[48960] VGAM3500 gene, herein designated VGAM GENE, encodes a VGAM3500 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3500 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3500 precursor RNA is designated SEQ ID:79307, and is provided hereinbelow with reference to the sequence listing part.

[48961] VGAM3500 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3500 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48962] An enzyme complex designated DICER COMPLEX, dices

the VGAM3500 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3500 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3500 RNA is designated SEQ ID:79308, and is provided hereinbelow with reference to the sequence listing part.

[48963] VGAM3500 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3500 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3500 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48964] VGAM3500 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3500 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3500 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3500 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3500 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48965] The complementary binding of VGAM3500 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3500 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3500 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3500 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48966] It is appreciated that VGAM3500 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3500 host target genes. The mRNA of each one of this plurality of VGAM3500 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3500 RNA, herein designated VGAM RNA, and which when bound by VGAM3500 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3500 host target proteins.

[48967] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3500 gene, herein designated VGAM GENE, on one or more VGAM3500 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48968] It is yet further appreciated that a function of VGAM3500 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3500 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus D. Specific functions, and accordingly utilities, of VGAM3500 correlate with, and may be deduced from, the identity of the host target genes which VGAM3500 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48969] Nucleotide sequences of the VGAM3500 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3500 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3500 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3500 are further described hereinbelow with reference to Table 1.

[48970] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3500 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48971] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3501 (VGAM3501) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48972] VGAM3501 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3501 was detected is described hereinabove with reference to Figs. 2-8.

[48973] VGAM3501 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6. VGAM3501 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[48974] VGAM3501 gene, herein designated VGAM GENE, encodes a VGAM3501 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3501 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3501 precursor RNA is designated SEQ ID:79312, and is provided hereinbelow with reference to the sequence listing part.

[48975] VGAM3501 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3501 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48976] An enzyme complex designated DICER COMPLEX, dices the VGAM3501 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3501 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3501 RNA is designated SEQ ID:79313, and is provided hereinbelow with reference to the sequence listing part.

[48977] VGAM3501 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3501 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3501 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48978] VGAM3501 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3501 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3501 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3501 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3501 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48979] The complementary binding of VGAM3501 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3501 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3501

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3501 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48980] It is appreciated that VGAM3501 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3501 host target genes. The mRNA of each one of this plurality of VGAM3501 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3501 RNA, herein designated VGAM RNA, and which when bound by VGAM3501 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3501 host target proteins.

[48981] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3501 gene, herein designated VGAM GENE, on one or more VGAM3501 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48982] It is yet further appreciated that a function of VGAM3501 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3501 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6. Specific functions, and accordingly utilities, of VGAM3501 correlate with, and may be deduced from, the identity of the host target genes which VGAM3501 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48983] Nucleotide sequences of the VGAM3501 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3501 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3501 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3501 are further described hereinbelow with reference to Table 1.

[48984] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3501 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48985] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3502 (VGAM3502) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[48986] VGAM3502 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3502 was detected is described hereinabove with reference to Figs. 2-8.

[48987] VGAM3502 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ictalurid herpesvirus 1. VGAM3502 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[48988] VGAM3502 gene, herein designated VGAM GENE, encodes a VGAM3502 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3502 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3502 precursor RNA is designated SEQ ID:79318, and is provided hereinbelow with reference to the sequence listing part.

[48989] VGAM3502 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3502 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[48990] An enzyme complex designated DICER COMPLEX, dices the VGAM3502 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3502 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3502 RNA is designated SEQ ID:79319, and is provided hereinbelow with reference to the sequence listing part.

[48991] VGAM3502 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3502 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3502 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[48992] VGAM3502 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3502 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3502 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3502 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3502 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[48993] The complementary binding of VGAM3502 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3502 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3502 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3502 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[48994] It is appreciated that VGAM3502 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3502 host target genes. The mRNA of each one of this plurality of VGAM3502 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3502 RNA, herein designated VGAM RNA, and which when bound by VGAM3502 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3502 host target proteins.

[48995] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3502 gene, herein designated VGAM GENE, on one or more VGAM3502 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[48996] It is yet further appreciated that a function of VGAM3502 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3502 include diagnosis, prevention and treatment of viral infection by Ictalurid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3502 correlate with, and may be deduced from, the identity of the host target genes which VGAM3502 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[48997] Nucleotide sequences of the VGAM3502 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3502 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3502 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3502 are further

described hereinbelow with reference to Table 1.

[48998] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3502 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[48999] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3503 (VGAM3503) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49000] VGAM3503 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3503 was detected is described hereinabove with reference to Figs. 2-8.

[49001] VGAM3503 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Black queen cell virus. VGAM3503 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49002] VGAM3503 gene, herein designated VGAM GENE, encodes a VGAM3503 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3503 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3503 precursor RNA is designated SEQ ID:79326, and is provided hereinbelow with reference to the sequence listing part.

[49003] VGAM3503 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3503 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49004] An enzyme complex designated DICER COMPLEX, dices the VGAM3503 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3503 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3503 RNA is designated SEQ ID:79327, and is provided hereinbelow with reference to the sequence listing part.

[49005] VGAM3503 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3503 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3503 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49006] VGAM3503 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3503 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3503 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3503 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3503 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49007] The complementary binding of VGAM3503 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3503 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3503 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3503 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49008] It is appreciated that VGAM3503 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3503 host target genes. The mRNA of each one of this plurality of VGAM3503 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3503 RNA, herein designated VGAM RNA, and which when bound by VGAM3503 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3503 host target proteins.

[49009] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3503 gene, herein designated VGAM GENE, on one or more VGAM3503 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49010] It is yet further appreciated that a function of VGAM3503 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3503 include diagnosis, prevention and treatment of viral infection by Black queen cell virus. Specific functions, and accordingly utilities, of VGAM3503 correlate with, and may be deduced from, the identity of the host target genes which VGAM3503 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49011] Nucleotide sequences of the VGAM3503 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3503 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3503 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3503 are further described hereinbelow with reference to Table 1.

[49012] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3503 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49013] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3504 (VGAM3504) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49014] VGAM3504 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3504 was detected is described hereinabove with reference to Figs. 2-8.

[49015] VGAM3504 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3504 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49016] VGAM3504 gene, herein designated VGAM GENE, encodes

a VGAM3504 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3504 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3504 precursor RNA is designated SEQ ID:79338, and is provided hereinbelow with reference to the sequence listing part.

[49017] VGAM3504 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3504 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49018] An enzyme complex designated DICER COMPLEX, dices the VGAM3504 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3504 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3504 RNA is designated SEQ ID:79339, and is provided hereinbelow with reference to the sequence listing part.

[49019] VGAM3504 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3504 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3504 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49020] VGAM3504 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3504 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3504 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3504 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3504 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49021] The complementary binding of VGAM3504 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3504 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3504 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3504 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[49022] It is appreciated that VGAM3504 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3504 host target genes. The mRNA of each one of this plurality of VGAM3504 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3504 RNA, herein designated VGAM RNA, and which when bound by VGAM3504 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3504 host target proteins.

[49023] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3504 gene, herein designated VGAM GENE, on one or more VGAM3504 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49024] It is yet further appreciated that a function of VGAM3504 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3504 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3504 correlate with, and may be deduced from, the identity of the host target genes which VGAM3504 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49025] Nucleotide sequences of the VGAM3504 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3504 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3504 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3504 are further described hereinbelow with reference to Table 1.

[49026] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3504 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49027] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3505 (VGAM3505) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49028] VGAM3505 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3505 was detected is described hereinabove with reference to Figs. 2-8.

[49029] VGAM3505 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Yam mosaic virus. VGAM3505 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49030] VGAM3505 gene, herein designated VGAM GENE, encodes a VGAM3505 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3505 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3505 precursor RNA is designated SEQ ID:79343, and is provided hereinbelow with reference to the sequence listing part.

[49031] VGAM3505 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3505 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49032] An enzyme complex designated DICER COMPLEX, dices the VGAM3505 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3505 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3505 RNA is designated SEQ ID:79344, and is provided hereinbelow with reference to the sequence listing part.

[49033] VGAM3505 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3505 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3505 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49034] VGAM3505 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3505 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3505 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3505 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3505 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49035] The complementary binding of VGAM3505 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3505 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3505 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3505 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49036] It is appreciated that VGAM3505 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3505 host target genes. The mRNA of each one of this plurality of VGAM3505 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3505 RNA, herein designated VGAM RNA, and which when bound by VGAM3505 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3505 host target proteins.

[49037] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3505 gene, herein designated VGAM GENE, on one or more VGAM3505 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49038] It is yet further appreciated that a function of VGAM3505 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3505 include diagnosis, prevention and treatment of viral infection by Yam mosaic virus. Specific functions, and accordingly utilities, of VGAM3505 correlate with, and may be deduced from, the identity of the host target genes which VGAM3505 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49039] Nucleotide sequences of the VGAM3505 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3505 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3505 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3505 are further described hereinbelow with reference to Table 1.

[49040] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3505 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49041] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3506 (VGAM3506) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49042] VGAM3506 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3506 was detected is described hereinabove with reference to Figs. 2-8.

[49043] VGAM3506 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Yam mosaic virus. VGAM3506 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49044] VGAM3506 gene, herein designated VGAM GENE, encodes a VGAM3506 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3506 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3506 precursor RNA is designated SEQ ID:79355, and is provided hereinbelow with reference to the sequence listing part.

[49045] VGAM3506 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3506 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49046] An enzyme complex designated DICER COMPLEX, dices the VGAM3506 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3506 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3506 RNA is designated SEQ ID:79356, and is provided hereinbelow with reference to the sequence listing part.

[49047] VGAM3506 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3506 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3506 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49048] VGAM3506 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3506 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3506 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3506 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3506 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49049] The complementary binding of VGAM3506 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3506 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3506 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3506 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49050] It is appreciated that VGAM3506 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3506 host target genes. The mRNA of each one of this plurality of VGAM3506 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3506 RNA, herein designated VGAM RNA, and which when bound by VGAM3506 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3506 host target proteins.

[49051] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3506 gene, herein designated VGAM GENE, on one or more VGAM3506 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49052] It is yet further appreciated that a function of VGAM3506 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3506 include diagnosis, prevention and treatment of viral infection by Yam mosaic virus. Specific functions, and accordingly utilities, of VGAM3506 correlate with, and may be deduced from, the identity of the host target genes which VGAM3506 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49053] Nucleotide sequences of the VGAM3506 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3506 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3506 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3506 are further described hereinbelow with reference to Table 1.

[49054] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3506 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49055] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3507 (VGAM3507) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49056] VGAM3507 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3507 was detected is described hereinabove with reference to Figs. 2–8.

[49057] VGAM3507 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Soybean dwarf virus. VGAM3507 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49058] VGAM3507 gene, herein designated VGAM GENE, encodes a VGAM3507 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3507 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3507 precursor RNA is designated SEQ ID:79368, and is provided hereinbelow with reference to the sequence listing part.

[49059] VGAM3507 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3507 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49060] An enzyme complex designated DICER COMPLEX, dices the VGAM3507 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3507 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3507 RNA is designated SEQ ID:79369, and is provided hereinbelow with reference to the sequence listing part.

[49061] VGAM3507 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3507 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3507 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49062] VGAM3507 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3507 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3507 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3507 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3507 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49063] The complementary binding of VGAM3507 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3507 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3507 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3507 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49064] It is appreciated that VGAM3507 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3507 host target genes. The mRNA of each one of this plurality of VGAM3507 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3507 RNA, herein designated VGAM RNA, and which when bound by VGAM3507 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3507 host target proteins.

[49065] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3507 gene, herein designated VGAM GENE, on one or more VGAM3507 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [49066] It is yet further appreciated that a function of VGAM3507 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3507 include diagnosis, prevention and treatment of viral infection by Soybean dwarf virus. Specific functions, and accordingly utilities, of VGAM3507 correlate with, and may be deduced from, the identity of the host target genes which VGAM3507 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [49067] Nucleotide sequences of the VGAM3507 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3507 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3507 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3507 are further described hereinbelow with reference to Table 1.
- [49068] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3507 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49069] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3508 (VGAM3508) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49070] VGAM3508 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3508 was detected is described hereinabove with reference to Figs. 2-8.

[49071] VGAM3508 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Soil-borne cereal mosaic virus. VGAM3508 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49072] VGAM3508 gene, herein designated VGAM GENE, encodes a VGAM3508 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3508 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3508 precursor RNA is designated SEQ ID:79383, and is provided hereinbelow with reference to the sequence listing part.

[49073] VGAM3508 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3508 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49074] An enzyme complex designated DICER COMPLEX, dices the VGAM3508 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3508 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide se-

quence of VGAM3508 RNA is designated SEQ ID:79384, and is provided hereinbelow with reference to the sequence listing part.

[49075] VGAM3508 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3508 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3508 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49076] VGAM3508 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3508 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3508 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3508 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3508 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49077] The complementary binding of VGAM3508 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3508 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3508 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3508 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49078] It is appreciated that VGAM3508 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3508 host target genes. The mRNA of

each one of this plurality of VGAM3508 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3508 RNA, herein designated VGAM RNA, and which when bound by VGAM3508 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3508 host target proteins.

[49079] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3508 gene, herein designated VGAM GENE, on one or more VGAM3508 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[49080] It is yet further appreciated that a function of VGAM3508 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3508 include diagnosis, prevention and treatment of viral infection by Soil-borne cereal mosaic virus. Specific functions, and accordingly utilities, of VGAM3508 correlate with, and may be deduced from, the identity of the host target genes which VGAM3508 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49081] Nucleotide sequences of the VGAM3508 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3508 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3508 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3508 are further described hereinbelow with reference to Table 1.

[49082] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3508 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[49083] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3509 (VGAM3509) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49084] VGAM3509 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3509 was detected is described hereinabove with reference to Figs. 2–8.

[49085] VGAM3509 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3. VGAM3509 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49086] VGAM3509 gene, herein designated VGAM GENE, encodes a VGAM3509 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3509 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3509 precursor RNA is designated SEQ ID:79386, and is provided hereinbelow with reference to the sequence listing part.

[49087] VGAM3509 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3509 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49088] An enzyme complex designated DICER COMPLEX, dices the VGAM3509 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3509 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3509 RNA is designated SEQ ID:79387,

and is provided hereinbelow with reference to the sequence listing part.

[49089] VGAM3509 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3509 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3509 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49090] VGAM3509 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3509 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3509 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3509 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3509 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49091] The complementary binding of VGAM3509 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3509 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3509 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3509 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49092] It is appreciated that VGAM3509 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3509 host target genes. The mRNA of each one of this plurality of VGAM3509 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3509 RNA, herein designated VGAM RNA, and which when bound by VGAM3509 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3509 host target proteins.

[49093] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3509 gene, herein designated VGAM GENE, on one or more VGAM3509 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49094] It is yet further appreciated that a function of VGAM3509 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3509 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3509 correlate with, and may be deduced from, the identity of the host target genes which VGAM3509 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49095] Nucleotide sequences of the VGAM3509 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3509 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3509 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3509 are further described hereinbelow with reference to Table 1.

[49096] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3509 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49097] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3510 (VGAM3510) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49098] VGAM3510 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3510 was detected is described hereinabove with reference to Figs. 2–8.

[49099] VGAM3510 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3. VGAM3510 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49100] VGAM3510 gene, herein designated VGAM GENE, encodes a VGAM3510 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3510 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3510 precursor

sor RNA is designated SEQ ID:79396, and is provided hereinbelow with reference to the sequence listing part.

[49101] VGAM3510 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3510 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49102] An enzyme complex designated DICER COMPLEX, dices the VGAM3510 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3510 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3510 RNA is designated SEQ ID:79397, and is provided hereinbelow with reference to the se-

quence listing part.

[49103] VGAM3510 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3510 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3510 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49104] VGAM3510 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3510 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3510 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3510 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3510 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49105] The complementary binding of VGAM3510 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3510 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3510 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3510 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49106] It is appreciated that VGAM3510 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3510 host target genes. The mRNA of each one of this plurality of VGAM3510 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3510 RNA, herein designated VGAM RNA, and which when bound by VGAM3510 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3510 host target proteins.

[49107] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3510 gene, herein designated VGAM GENE, on one or more VGAM3510 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49108] It is yet further appreciated that a function of VGAM3510

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3510 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3510 correlate with, and may be deduced from, the identity of the host target genes which VGAM3510 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49109] Nucleotide sequences of the VGAM3510 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3510 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3510 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3510 are further described hereinbelow with reference to Table 1.

[49110] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3510 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49111] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3511 (VGAM3511) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49112] VGAM3511 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3511 was detected is described hereinabove with reference to Figs. 2–8.

[49113] VGAM3511 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3511 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49114] VGAM3511 gene, herein designated VGAM GENE, encodes a VGAM3511 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3511 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3511 precursor RNA is designated SEQ ID:79403, and is provided

hereinbelow with reference to the sequence listing part.

[49115] VGAM3511 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3511 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49116] An enzyme complex designated DICER COMPLEX, dices the VGAM3511 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3511 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3511 RNA is designated SEQ ID:79404, and is provided hereinbelow with reference to the sequence listing part.

[49117] VGAM3511 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3511 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3511 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49118] VGAM3511 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3511 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3511 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3511 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3511 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49119] The complementary binding of VGAM3511 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3511 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3511 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3511 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49120] It is appreciated that VGAM3511 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3511 host target genes. The mRNA of each one of this plurality of VGAM3511 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3511 RNA, herein designated VGAM RNA, and which when bound by VGAM3511 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3511 host target proteins.

[49121] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3511 gene, herein designated VGAM GENE, on one or more VGAM3511 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49122] It is yet further appreciated that a function of VGAM3511 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3511 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3511 correlate with, and may be deduced from, the identity of the host target genes which VGAM3511 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49123] Nucleotide sequences of the VGAM3511 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3511 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3511 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3511 are further described hereinbelow with reference to Table 1.

[49124] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3511 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49125] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3512 (VGAM3512) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49126] VGAM3512 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3512 was detected is described hereinabove with reference to Figs. 2–8.

[49127] VGAM3512 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chinese wheat mosaic virus. VGAM3512 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49128] VGAM3512 gene, herein designated VGAM GENE, encodes a VGAM3512 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3512 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3512 precursor RNA is designated SEQ ID:79409, and is provided hereinbelow with reference to the sequence listing part.

[49129] VGAM3512 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3512 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49130] An enzyme complex designated DICER COMPLEX, dices the VGAM3512 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3512 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3512 RNA is designated SEQ ID:79410, and is provided hereinbelow with reference to the sequence listing part.

[49131] VGAM3512 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3512 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3512 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49132] VGAM3512 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3512 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3512 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3512 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3512 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49133] The complementary binding of VGAM3512 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3512 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3512 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3512 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49134] It is appreciated that VGAM3512 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3512 host target genes. The mRNA of each one of this plurality of VGAM3512 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3512 RNA, herein designated VGAM

RNA, and which when bound by VGAM3512 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3512 host target proteins.

[49135] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3512 gene, herein designated VGAM GENE, on one or more VGAM3512 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49136] It is yet further appreciated that a function of VGAM3512 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3512 include diagnosis, prevention and treatment of viral infection by Chinese wheat mosaic virus. Specific functions, and accordingly utilities, of VGAM3512 correlate with, and may be deduced from, the identity of the host target genes which VGAM3512 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49137] Nucleotide sequences of the VGAM3512 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3512 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3512 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3512 are further described hereinbelow with reference to Table 1.

[49138] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3512 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49139] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3513 (VGAM3513) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49140] VGAM3513 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3513 was detected is described hereinabove with reference to Figs. 2–8.

[49141] VGAM3513 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Taura syndrome virus. VGAM3513 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49142] VGAM3513 gene, herein designated VGAM GENE, encodes a VGAM3513 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3513 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3513 precursor RNA is designated SEQ ID:79419, and is provided hereinbelow with reference to the sequence listing part.

[49143] VGAM3513 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3513 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49144] An enzyme complex designated DICER COMPLEX, dices the VGAM3513 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3513 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3513 RNA is designated SEQ ID:79420, and is provided hereinbelow with reference to the sequence listing part.

[49145] VGAM3513 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3513 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3513 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49146] VGAM3513 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3513 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3513 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3513 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3513 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49147] The complementary binding of VGAM3513 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3513 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3513 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3513 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49148] It is appreciated that VGAM3513 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3513 host target genes. The mRNA of each one of this plurality of VGAM3513 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3513 RNA, herein designated VGAM RNA, and which when bound by VGAM3513 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3513 host target proteins.

[49149] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3513 gene, herein designated VGAM GENE, on one or more VGAM3513 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49150] It is yet further appreciated that a function of VGAM3513 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3513 include diagnosis, prevention and

treatment of viral infection by Taura syndrome virus. Specific functions, and accordingly utilities, of VGAM3513 correlate with, and may be deduced from, the identity of the host target genes which VGAM3513 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49151] Nucleotide sequences of the VGAM3513 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3513 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3513 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3513 are further described hereinbelow with reference to Table 1.

[49152] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3513 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49153] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3514 (VGAM3514) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49154] VGAM3514 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3514 was detected is described hereinabove with reference to Figs. 2–8.

[49155] VGAM3514 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Papaya ringspot virus. VGAM3514 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49156] VGAM3514 gene, herein designated VGAM GENE, encodes a VGAM3514 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3514 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3514 precursor RNA is designated SEQ ID:79487, and is provided hereinbelow with reference to the sequence listing part.

[49157] VGAM3514 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3514 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49158] An enzyme complex designated DICER COMPLEX, dices the VGAM3514 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3514 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3514 RNA is designated SEQ ID:79488, and is provided hereinbelow with reference to the sequence listing part.

[49159] VGAM3514 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3514 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3514 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49160] VGAM3514 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3514 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3514 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3514 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3514 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49161] The complementary binding of VGAM3514 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3514 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3514 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3514 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49162] It is appreciated that VGAM3514 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3514 host target genes. The mRNA of each one of this plurality of VGAM3514 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3514 RNA, herein designated VGAM RNA, and which when bound by VGAM3514 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3514 host target proteins.

[49163] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3514 gene, herein designated VGAM GENE, on one or more VGAM3514 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49164] It is yet further appreciated that a function of VGAM3514 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3514 include diagnosis, prevention and treatment of viral infection by Papaya ringspot virus. Spe-

cific functions, and accordingly utilities, of VGAM3514 correlate with, and may be deduced from, the identity of the host target genes which VGAM3514 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49165] Nucleotide sequences of the VGAM3514 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3514 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3514 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3514 are further described hereinbelow with reference to Table 1.

[49166] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3514 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49167] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3515 (VGAM3515) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[49168] VGAM3515 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3515 was detected is described hereinabove with reference to Figs. 2–8.

[49169] VGAM3515 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Newcastle disease virus. VGAM3515 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49170] VGAM3515 gene, herein designated VGAM GENE, encodes a VGAM3515 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3515 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3515 precursor RNA is designated SEQ ID:79598, and is provided hereinbelow with reference to the sequence listing part.

[49171] VGAM3515 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3515 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49172] An enzyme complex designated DICER COMPLEX, dices the VGAM3515 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3515 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3515 RNA is designated SEQ ID:79599, and is provided hereinbelow with reference to the sequence listing part.

[49173] VGAM3515 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3515 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3515 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49174] VGAM3515 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3515 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3515 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3515 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3515 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49175] The complementary binding of VGAM3515 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3515 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3515 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3515 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49176] It is appreciated that VGAM3515 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3515 host target genes. The mRNA of each one of this plurality of VGAM3515 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3515 RNA, herein designated VGAM RNA, and which when bound by VGAM3515 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3515 host target proteins.

[49177] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3515 gene, herein designated VGAM GENE, on one or more VGAM3515 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49178] It is yet further appreciated that a function of VGAM3515 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3515 include diagnosis, prevention and treatment of viral infection by Newcastle disease virus. Specific functions, and accordingly utilities, of VGAM3515

correlate with, and may be deduced from, the identity of the host target genes which VGAM3515 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49179] Nucleotide sequences of the VGAM3515 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3515 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3515 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3515 are further described hereinbelow with reference to Table 1.

[49180] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3515 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49181] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3516 (VGAM3516) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[49182] VGAM3516 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3516 was detected is described hereinabove with reference to Figs. 2–8.

[49183] VGAM3516 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lumpy skin disease virus. VGAM3516 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49184] VGAM3516 gene, herein designated VGAM GENE, encodes a VGAM3516 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3516 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3516 precursor RNA is designated SEQ ID:79610, and is provided hereinbelow with reference to the sequence listing part.

[49185] VGAM3516 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3516 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49186] An enzyme complex designated DICER COMPLEX, dices the VGAM3516 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3516 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3516 RNA is designated SEQ ID:79611, and is provided hereinbelow with reference to the sequence listing part.

[49187] VGAM3516 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3516 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3516 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49188] VGAM3516 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3516 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3516 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3516 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3516 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49189] The complementary binding of VGAM3516 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3516 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3516 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3516 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49190] It is appreciated that VGAM3516 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3516 host target genes. The mRNA of each one of this plurality of VGAM3516 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3516 RNA, herein designated VGAM RNA, and which when bound by VGAM3516 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3516 host target proteins.

[49191] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3516 gene, herein designated VGAM GENE, on one or more VGAM3516 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49192] It is yet further appreciated that a function of VGAM3516 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3516 include diagnosis, prevention and treatment of viral infection by Lumpy skin disease virus. Specific functions, and accordingly utilities, of VGAM3516 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3516 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49193] Nucleotide sequences of the VGAM3516 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3516 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3516 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3516 are further described hereinbelow with reference to Table 1.

[49194] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3516 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49195] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3517 (VGAM3517) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49196] VGAM3517 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3517 was detected is described hereinabove with reference to Figs. 2–8.

[49197] VGAM3517 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sheeppox virus. VGAM3517 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49198] VGAM3517 gene, herein designated VGAM GENE, encodes a VGAM3517 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3517 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3517 precursor RNA is designated SEQ ID:79614, and is provided hereinbelow with reference to the sequence listing part.

[49199] VGAM3517 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3517 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49200] An enzyme complex designated DICER COMPLEX, dices the VGAM3517 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3517 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3517 RNA is designated SEQ ID:79615, and is provided hereinbelow with reference to the sequence listing part.

[49201] VGAM3517 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3517 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3517 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49202] VGAM3517 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3517 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3517 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3517 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3517 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49203] The complementary binding of VGAM3517 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3517 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3517 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3517 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49204] It is appreciated that VGAM3517 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3517 host target genes. The mRNA of each one of this plurality of VGAM3517 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3517 RNA, herein designated VGAM RNA, and which when bound by VGAM3517 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3517 host target proteins.

[49205] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3517 gene, herein designated VGAM GENE, on one or more VGAM3517 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49206] It is yet further appreciated that a function of VGAM3517 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3517 include diagnosis, prevention and treatment of viral infection by Sheeppox virus. Specific functions, and accordingly utilities, of VGAM3517 correlate with, and may be deduced from, the identity of the host target genes which VGAM3517 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[49207] Nucleotide sequences of the VGAM3517 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3517 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3517 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3517 are further described hereinbelow with reference to Table 1.

[49208] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3517 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49209] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3518 (VGAM3518) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49210] VGAM3518 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3518 was detected is described hereinabove with reference to Figs. 2-8.

[49211] VGAM3518 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3518 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49212] VGAM3518 gene, herein designated VGAM GENE, encodes a VGAM3518 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3518 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3518 precursor RNA is designated SEQ ID:79620, and is provided hereinbelow with reference to the sequence listing part.

[49213] VGAM3518 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3518 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49214] An enzyme complex designated DICER COMPLEX, dices the VGAM3518 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3518 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3518 RNA is designated SEQ ID:79621, and is provided hereinbelow with reference to the sequence listing part.

[49215] VGAM3518 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3518 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3518 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49216] VGAM3518 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3518 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3518 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3518 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3518 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[49217] The complementary binding of VGAM3518 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3518 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3518 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3518 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49218] It is appreciated that VGAM3518 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3518 host target genes. The mRNA of each one of this plurality of VGAM3518 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3518 RNA, herein designated VGAM RNA, and which when bound by VGAM3518 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3518 host target proteins.

[49219] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3518 gene, herein designated VGAM GENE, on one or more VGAM3518 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49220] It is yet further appreciated that a function of VGAM3518 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3518 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3518 correlate with, and may be deduced from, the identity of the host target genes which VGAM3518 binds and inhibits, and the function of these

host target genes, as elaborated hereinbelow.

[49221] Nucleotide sequences of the VGAM3518 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3518 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3518 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3518 are further described hereinbelow with reference to Table 1.

[49222] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3518 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49223] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3519 (VGAM3519) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49224] VGAM3519 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3519 was detected is described hereinabove with reference to Figs. 2–8.

[49225] VGAM3519 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3519 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49226] VGAM3519 gene, herein designated VGAM GENE, encodes a VGAM3519 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3519 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3519 precursor RNA is designated SEQ ID:79642, and is provided hereinbelow with reference to the sequence listing part.

[49227] VGAM3519 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3519 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49228] An enzyme complex designated DICER COMPLEX, dices the VGAM3519 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3519 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3519 RNA is designated SEQ ID:79643, and is provided hereinbelow with reference to the sequence listing part.

[49229] VGAM3519 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3519 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3519 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[49230] VGAM3519 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3519 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3519 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3519 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3519 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49231] The complementary binding of VGAM3519 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3519 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3519 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3519 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49232] It is appreciated that VGAM3519 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3519 host target genes. The mRNA of each one of this plurality of VGAM3519 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3519 RNA, herein designated VGAM RNA, and which when bound by VGAM3519 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3519 host target proteins.

[49233] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3519 gene, herein designated VGAM GENE, on one

or more VGAM3519 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49234] It is yet further appreciated that a function of VGAM3519 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3519 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3519 correlate with, and may be deduced from, the identity of the host target genes which VGAM3519 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49235] Nucleotide sequences of the VGAM3519 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3519 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3519 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3519 are further described hereinbelow with reference to Table 1.

[49236] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3519 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49237] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3520 (VGAM3520) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49238] VGAM3520 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3520 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[49239] VGAM3520 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3520 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49240] VGAM3520 gene, herein designated VGAM GENE, encodes a VGAM3520 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3520 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3520 precursor RNA is designated SEQ ID:79650, and is provided hereinbelow with reference to the sequence listing part.

[49241] VGAM3520 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3520 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49242] An enzyme complex designated DICER COMPLEX, dices the VGAM3520 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3520 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3520 RNA is designated SEQ ID:79651, and is provided hereinbelow with reference to the sequence listing part.

[49243] VGAM3520 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3520 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3520 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49244] VGAM3520 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3520 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3520 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3520 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3520 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49245] The complementary binding of VGAM3520 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3520 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3520 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3520 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49246] It is appreciated that VGAM3520 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3520 host target genes. The mRNA of each one of this plurality of VGAM3520 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3520 RNA, herein designated VGAM RNA, and which when bound by VGAM3520 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3520 host target proteins.

[49247] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3520 gene, herein designated VGAM GENE, on one or more VGAM3520 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49248] It is yet further appreciated that a function of VGAM3520 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3520 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3520 correlate with, and may be deduced from, the identity of the host target genes which VGAM3520 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49249] Nucleotide sequences of the VGAM3520 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3520 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3520 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3520 are further described hereinbelow with reference to Table 1.

[49250] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3520 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49251] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3521 (VGAM3521) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49252] VGAM3521 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3521 was detected is described hereinabove with reference to Figs. 2-8.

[49253] VGAM3521 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ictalurid herpesvirus 1. VGAM3521 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49254] VGAM3521 gene, herein designated VGAM GENE, encodes a VGAM3521 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3521 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3521 precursor RNA is designated SEQ ID:79712, and is provided hereinbelow with reference to the sequence listing part.

[49255] VGAM3521 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3521 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[49256] An enzyme complex designated DICER COMPLEX, dices the VGAM3521 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3521 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3521 RNA is designated SEQ ID:79713, and is provided hereinbelow with reference to the sequence listing part.

[49257] VGAM3521 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3521 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3521 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49258] VGAM3521 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3521 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3521 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3521 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3521 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49259] The complementary binding of VGAM3521 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3521 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3521 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3521 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49260] It is appreciated that VGAM3521 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3521 host target genes. The mRNA of each one of this plurality of VGAM3521 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3521 RNA, herein designated VGAM RNA, and which when bound by VGAM3521 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3521 host target proteins.

[49261] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3521 gene, herein designated VGAM GENE, on one or more VGAM3521 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49262] It is yet further appreciated that a function of VGAM3521 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3521 include diagnosis, prevention and treatment of viral infection by Ictalurid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3521 correlate with, and may be deduced from, the identity of the host target genes which VGAM3521 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49263] Nucleotide sequences of the VGAM3521 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3521 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3521 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3521 are further described hereinbelow with reference to Table 1.

[49264] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3521 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49265] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3522 (VGAM3522) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49266] VGAM3522 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3522 was detected is described hereinabove with reference to Figs. 2-8.

[49267] VGAM3522 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Tobacco necrosis virus D. VGAM3522 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49268] VGAM3522 gene, herein designated VGAM GENE, encodes a VGAM3522 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3522 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3522 precursor RNA is designated SEQ ID:79724, and is provided hereinbelow with reference to the sequence listing part.

[49269] VGAM3522 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3522 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49270] An enzyme complex designated DICER COMPLEX, dices the VGAM3522 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3522 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3522 RNA is designated SEQ ID:79725, and is provided hereinbelow with reference to the sequence listing part.

[49271] VGAM3522 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3522 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3522 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49272] VGAM3522 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3522 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3522 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3522 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3522 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49273] The complementary binding of VGAM3522 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3522 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3522 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3522 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49274] It is appreciated that VGAM3522 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3522 host target genes. The mRNA of each one of this plurality of VGAM3522 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3522 RNA, herein designated VGAM RNA, and which when bound by VGAM3522 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3522 host target proteins.

[49275] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3522 gene, herein designated VGAM GENE, on one or more VGAM3522 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49276] It is yet further appreciated that a function of VGAM3522 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3522 include diagnosis, prevention and treatment of viral infection by Tobacco necrosis virus D. Specific functions, and accordingly utilities, of VGAM3522 correlate with, and may be deduced from, the identity of the host target genes which VGAM3522 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49277] Nucleotide sequences of the VGAM3522 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3522 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3522 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3522 are further described hereinbelow with reference to Table 1.

[49278] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3522 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49279] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3523 (VGAM3523) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49280] VGAM3523 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3523 was detected is described hereinabove with reference to Figs. 2-8.

[49281] VGAM3523 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2.

VGAM3523 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49282] VGAM3523 gene, herein designated VGAM GENE, encodes a VGAM3523 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3523 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3523 precursor RNA is designated SEQ ID:79728, and is provided hereinbelow with reference to the sequence listing part.

[49283] VGAM3523 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3523 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49284] An enzyme complex designated DICER COMPLEX, dices

the VGAM3523 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3523 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3523 RNA is designated SEQ ID:79729, and is provided hereinbelow with reference to the sequence listing part.

[49285] VGAM3523 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3523 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3523 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49286] VGAM3523 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3523 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3523 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3523 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3523 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49287] The complementary binding of VGAM3523 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3523 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3523 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3523 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49288] It is appreciated that VGAM3523 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3523 host target genes. The mRNA of each one of this plurality of VGAM3523 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3523 RNA, herein designated VGAM RNA, and which when bound by VGAM3523 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3523 host target proteins.

[49289] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3523 gene, herein designated VGAM GENE, on one or more VGAM3523 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49290] It is yet further appreciated that a function of VGAM3523 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3523 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3523 correlate with, and may be deduced from, the identity of the host target genes which VGAM3523 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49291] Nucleotide sequences of the VGAM3523 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3523 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3523 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3523 are further described hereinbelow with reference to Table 1.

[49292] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3523 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49293] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3524 (VGAM3524) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49294] VGAM3524 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3524 was detected is described hereinabove with reference to Figs. 2-8.

[49295] VGAM3524 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pea enation mosaic virus-2. VGAM3524 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49296] VGAM3524 gene, herein designated VGAM GENE, encodes a VGAM3524 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3524 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3524 precursor RNA is designated SEQ ID:79738, and is provided hereinbelow with reference to the sequence listing part.

[49297] VGAM3524 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3524 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49298] An enzyme complex designated DICER COMPLEX, dices the VGAM3524 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3524 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3524 RNA is designated SEQ ID:79739, and is provided hereinbelow with reference to the sequence listing part.

[49299] VGAM3524 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3524 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3524 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49300] VGAM3524 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3524 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3524 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3524 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3524 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49301] The complementary binding of VGAM3524 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3524 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3524

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3524 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49302] It is appreciated that VGAM3524 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3524 host target genes. The mRNA of each one of this plurality of VGAM3524 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3524 RNA, herein designated VGAM RNA, and which when bound by VGAM3524 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3524 host target proteins.

[49303] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3524 gene, herein designated VGAM GENE, on one or more VGAM3524 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49304] It is yet further appreciated that a function of VGAM3524 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3524 include diagnosis, prevention and treatment of viral infection by Pea enation mosaic virus-2. Specific functions, and accordingly utilities, of VGAM3524 correlate with, and may be deduced from, the identity of the host target genes which VGAM3524 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49305] Nucleotide sequences of the VGAM3524 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3524 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3524 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3524 are further described hereinbelow with reference to Table 1.

[49306] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3524 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49307] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3525 (VGAM3525) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49308] VGAM3525 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3525 was detected is described hereinabove with reference to Figs. 2-8.

[49309] VGAM3525 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Periplaneta fuliginosa densovirus. VGAM3525 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene con-

tained in the human genome.

[49310] VGAM3525 gene, herein designated VGAM GENE, encodes a VGAM3525 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3525 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3525 precursor RNA is designated SEQ ID:79771, and is provided hereinbelow with reference to the sequence listing part.

[49311] VGAM3525 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3525 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49312] An enzyme complex designated DICER COMPLEX, dices the VGAM3525 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3525 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3525 RNA is designated SEQ ID:79772, and is provided hereinbelow with reference to the sequence listing part.

[49313] VGAM3525 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3525 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3525 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49314] VGAM3525 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3525 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3525 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3525 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3525 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49315] The complementary binding of VGAM3525 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3525 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3525 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3525 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49316] It is appreciated that VGAM3525 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3525 host target genes. The mRNA of each one of this plurality of VGAM3525 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3525 RNA, herein designated VGAM RNA, and which when bound by VGAM3525 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3525 host target proteins.

[49317] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3525 gene, herein designated VGAM GENE, on one or more VGAM3525 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49318] It is yet further appreciated that a function of VGAM3525 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3525 include diagnosis, prevention and treatment of viral infection by Periplaneta fuliginosa densovirus. Specific functions, and accordingly utilities, of VGAM3525 correlate with, and may be deduced from, the identity of the host target genes which VGAM3525 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49319] Nucleotide sequences of the VGAM3525 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3525 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3525 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3525 are further

described hereinbelow with reference to Table 1.

[49320] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3525 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49321] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3526 (VGAM3526) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49322] VGAM3526 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3526 was detected is described hereinabove with reference to Figs. 2-8.

[49323] VGAM3526 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3526 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49324] VGAM3526 gene, herein designated VGAM GENE, encodes a VGAM3526 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3526 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3526 precursor RNA is designated SEQ ID:79794, and is provided hereinbelow with reference to the sequence listing part.

[49325] VGAM3526 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3526 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49326] An enzyme complex designated DICER COMPLEX, dices the VGAM3526 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3526 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3526 RNA is designated SEQ ID:79795, and is provided hereinbelow with reference to the sequence listing part.

[49327] VGAM3526 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3526 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3526 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49328] VGAM3526 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3526 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3526 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3526 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3526 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49329] The complementary binding of VGAM3526 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3526 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3526 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3526 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49330] It is appreciated that VGAM3526 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3526 host target genes. The mRNA of each one of this plurality of VGAM3526 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3526 RNA, herein designated VGAM RNA, and which when bound by VGAM3526 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3526 host target proteins.

[49331] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3526 gene, herein designated VGAM GENE, on one or more VGAM3526 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49332] It is yet further appreciated that a function of VGAM3526 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3526 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3526 correlate with, and may be deduced from, the identity of the host target genes which VGAM3526 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49333] Nucleotide sequences of the VGAM3526 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3526 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3526 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3526 are further described hereinbelow with reference to Table 1.

[49334] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3526 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49335] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3527 (VGAM3527) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49336] VGAM3527 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3527 was detected is described hereinabove with reference to Figs. 2-8.

[49337] VGAM3527 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3527 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49338] VGAM3527 gene, herein designated VGAM GENE, encodes

a VGAM3527 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3527 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3527 precursor RNA is designated SEQ ID:79812, and is provided hereinbelow with reference to the sequence listing part.

[49339] VGAM3527 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3527 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49340] An enzyme complex designated DICER COMPLEX, dices the VGAM3527 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3527 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3527 RNA is designated SEQ ID:79813, and is provided hereinbelow with reference to the sequence listing part.

[49341] VGAM3527 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3527 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3527 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49342] VGAM3527 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3527 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3527 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3527 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3527 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49343] The complementary binding of VGAM3527 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3527 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3527 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3527 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[49344] It is appreciated that VGAM3527 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3527 host target genes. The mRNA of each one of this plurality of VGAM3527 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3527 RNA, herein designated VGAM RNA, and which when bound by VGAM3527 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3527 host target proteins.

[49345] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3527 gene, herein designated VGAM GENE, on one or more VGAM3527 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49346] It is yet further appreciated that a function of VGAM3527 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3527 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3527 correlate with, and may be deduced from, the identity of the host target genes which VGAM3527 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49347] Nucleotide sequences of the VGAM3527 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3527 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3527 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3527 are further described hereinbelow with reference to Table 1.

[49348] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3527 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49349] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3528 (VGAM3528) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49350] VGAM3528 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3528 was detected is described hereinabove with reference to Figs. 2-8.

[49351] VGAM3528 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3528 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49352] VGAM3528 gene, herein designated VGAM GENE, encodes a VGAM3528 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3528 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3528 precursor RNA is designated SEQ ID:79815, and is provided hereinbelow with reference to the sequence listing part.

[49353] VGAM3528 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3528 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49354] An enzyme complex designated DICER COMPLEX, dices the VGAM3528 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3528 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3528 RNA is designated SEQ ID:79816, and is provided hereinbelow with reference to the sequence listing part.

[49355] VGAM3528 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3528 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3528 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49356] VGAM3528 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3528 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3528 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3528 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3528 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49357] The complementary binding of VGAM3528 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3528 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3528 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3528 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49358] It is appreciated that VGAM3528 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3528 host target genes. The mRNA of each one of this plurality of VGAM3528 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3528 RNA, herein designated VGAM RNA, and which when bound by VGAM3528 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3528 host target proteins.

[49359] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3528 gene, herein designated VGAM GENE, on one or more VGAM3528 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49360] It is yet further appreciated that a function of VGAM3528 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3528 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3528 correlate with, and may be deduced from, the identity of the host target genes which VGAM3528 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49361] Nucleotide sequences of the VGAM3528 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3528 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3528 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3528 are further described hereinbelow with reference to Table 1.

[49362] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3528 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49363] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3529 (VGAM3529) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49364] VGAM3529 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3529 was detected is described hereinabove with reference to Figs. 2-8.

[49365] VGAM3529 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2. VGAM3529 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49366] VGAM3529 gene, herein designated VGAM GENE, encodes a VGAM3529 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3529 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3529 precursor RNA is designated SEQ ID:79822, and is provided hereinbelow with reference to the sequence listing part.

[49367] VGAM3529 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3529 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49368] An enzyme complex designated DICER COMPLEX, dices the VGAM3529 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3529 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3529 RNA is designated SEQ ID:79823, and is provided hereinbelow with reference to the sequence listing part.

[49369] VGAM3529 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3529 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3529 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49370] VGAM3529 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3529 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3529 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3529 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3529 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49371] The complementary binding of VGAM3529 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3529 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3529 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3529 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49372] It is appreciated that VGAM3529 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3529 host target genes. The mRNA of each one of this plurality of VGAM3529 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3529 RNA, herein designated VGAM RNA, and which when bound by VGAM3529 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3529 host target proteins.

[49373] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3529 gene, herein designated VGAM GENE, on one or more VGAM3529 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49374] It is yet further appreciated that a function of VGAM3529 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3529 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3529 correlate with, and may be deduced from, the identity of the host target genes which VGAM3529 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49375] Nucleotide sequences of the VGAM3529 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3529 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3529 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3529 are further described hereinbelow with reference to Table 1.

[49376] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3529 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49377] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3530 (VGAM3530) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49378] VGAM3530 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3530 was detected is described hereinabove with reference to Figs. 2–8.

[49379] VGAM3530 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3530 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49380] VGAM3530 gene, herein designated VGAM GENE, encodes a VGAM3530 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3530 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3530 precursor RNA is designated SEQ ID:79831, and is provided hereinbelow with reference to the sequence listing part.

[49381] VGAM3530 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3530 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49382] An enzyme complex designated DICER COMPLEX, dices the VGAM3530 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3530 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3530 RNA is designated SEQ ID:79832, and is provided hereinbelow with reference to the sequence listing part.

[49383] VGAM3530 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3530 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3530 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49384] VGAM3530 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3530 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3530 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3530 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3530 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49385] The complementary binding of VGAM3530 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3530 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3530 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3530 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49386] It is appreciated that VGAM3530 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3530 host target genes. The mRNA of each one of this plurality of VGAM3530 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3530 RNA, herein designated VGAM RNA, and which when bound by VGAM3530 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3530 host target proteins.

[49387] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3530 gene, herein designated VGAM GENE, on one or more VGAM3530 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [49388] It is yet further appreciated that a function of VGAM3530 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3530 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3530 correlate with, and may be deduced from, the identity of the host target genes which VGAM3530 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [49389] Nucleotide sequences of the VGAM3530 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3530 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3530 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3530 are further described hereinbelow with reference to Table 1.
- [49390] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3530 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49391] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3531 (VGAM3531) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49392] VGAM3531 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3531 was detected is described hereinabove with reference to Figs. 2-8.

[49393] VGAM3531 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3531 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49394] VGAM3531 gene, herein designated VGAM GENE, encodes a VGAM3531 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3531 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3531 precursor RNA is designated SEQ ID:79836, and is provided hereinbelow with reference to the sequence listing part.

[49395] VGAM3531 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3531 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49396] An enzyme complex designated DICER COMPLEX, dices the VGAM3531 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3531 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3531 RNA is designated SEQ ID:79837, and is provided hereinbelow with reference to the sequence listing part.

[49397] VGAM3531 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3531 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3531 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49398] VGAM3531 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3531 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3531 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3531 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3531 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49399] The complementary binding of VGAM3531 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3531 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3531 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3531 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49400] It is appreciated that VGAM3531 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3531 host target genes. The mRNA of

each one of this plurality of VGAM3531 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3531 RNA, herein designated VGAM RNA, and which when bound by VGAM3531 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3531 host target proteins.

[49401] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3531 gene, herein designated VGAM GENE, on one or more VGAM3531 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[49402] It is yet further appreciated that a function of VGAM3531 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3531 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3531 correlate with, and may be deduced from, the identity of the host target genes which VGAM3531 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49403] Nucleotide sequences of the VGAM3531 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3531 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3531 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3531 are further described hereinbelow with reference to Table 1.

[49404] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3531 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[49405] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3532 (VGAM3532) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49406] VGAM3532 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3532 was detected is described hereinabove with reference to Figs. 2–8.

[49407] VGAM3532 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 2. VGAM3532 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49408] VGAM3532 gene, herein designated VGAM GENE, encodes a VGAM3532 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3532 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3532 precursor RNA is designated SEQ ID:79852, and is provided hereinbelow with reference to the sequence listing part.

[49409] VGAM3532 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3532 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49410] An enzyme complex designated DICER COMPLEX, dices the VGAM3532 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3532 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3532 RNA is designated SEQ ID:79853,

and is provided hereinbelow with reference to the sequence listing part.

[49411] VGAM3532 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3532 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3532 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49412] VGAM3532 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3532 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3532 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3532 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3532 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49413] The complementary binding of VGAM3532 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3532 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3532 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3532 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49414] It is appreciated that VGAM3532 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3532 host target genes. The mRNA of each one of this plurality of VGAM3532 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3532 RNA, herein designated VGAM RNA, and which when bound by VGAM3532 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3532 host target proteins.

[49415] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3532 gene, herein designated VGAM GENE, on one or more VGAM3532 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49416] It is yet further appreciated that a function of VGAM3532 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3532 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3532 correlate with, and may be deduced from, the identity of the host target genes which VGAM3532 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49417] Nucleotide sequences of the VGAM3532 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3532 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3532 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3532 are further described hereinbelow with reference to Table 1.

[49418] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3532 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49419] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3533 (VGAM3533) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49420] VGAM3533 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3533 was detected is described hereinabove with reference to Figs. 2–8.

[49421] VGAM3533 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2. VGAM3533 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49422] VGAM3533 gene, herein designated VGAM GENE, encodes a VGAM3533 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3533 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3533 precu-

sor RNA is designated SEQ ID:79879, and is provided hereinbelow with reference to the sequence listing part.

[49423] VGAM3533 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3533 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49424] An enzyme complex designated DICER COMPLEX, dices the VGAM3533 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3533 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3533 RNA is designated SEQ ID:79880, and is provided hereinbelow with reference to the se-

quence listing part.

[49425] VGAM3533 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3533 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3533 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49426] VGAM3533 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3533 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3533 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3533 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3533 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49427] The complementary binding of VGAM3533 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3533 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3533 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3533 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49428] It is appreciated that VGAM3533 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3533 host target genes. The mRNA of each one of this plurality of VGAM3533 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3533 RNA, herein designated VGAM RNA, and which when bound by VGAM3533 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3533 host target proteins.

[49429] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3533 gene, herein designated VGAM GENE, on one or more VGAM3533 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49430] It is yet further appreciated that a function of VGAM3533

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3533 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3533 correlate with, and may be deduced from, the identity of the host target genes which VGAM3533 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49431] Nucleotide sequences of the VGAM3533 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3533 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3533 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3533 are further described hereinbelow with reference to Table 1.

[49432] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3533 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49433] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3534 (VGAM3534) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49434] VGAM3534 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3534 was detected is described hereinabove with reference to Figs. 2–8.

[49435] VGAM3534 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2. VGAM3534 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49436] VGAM3534 gene, herein designated VGAM GENE, encodes a VGAM3534 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3534 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3534 precursor RNA is designated SEQ ID:79896, and is provided

hereinbelow with reference to the sequence listing part.

[49437] VGAM3534 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3534 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49438] An enzyme complex designated DICER COMPLEX, dices the VGAM3534 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3534 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3534 RNA is designated SEQ ID:79897, and is provided hereinbelow with reference to the sequence listing part.

[49439] VGAM3534 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3534 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3534 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49440] VGAM3534 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3534 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3534 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3534 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3534 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49441] The complementary binding of VGAM3534 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3534 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3534 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3534 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49442] It is appreciated that VGAM3534 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3534 host target genes. The mRNA of each one of this plurality of VGAM3534 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3534 RNA, herein designated VGAM RNA, and which when bound by VGAM3534 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3534 host target proteins.

[49443] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3534 gene, herein designated VGAM GENE, on one or more VGAM3534 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49444] It is yet further appreciated that a function of VGAM3534 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3534 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-2.

Specific functions, and accordingly utilities, of VGAM3534 correlate with, and may be deduced from, the identity of the host target genes which VGAM3534 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49445] Nucleotide sequences of the VGAM3534 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3534 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3534 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3534 are further described hereinbelow with reference to Table 1.

[49446] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3534 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49447] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3535 (VGAM3535) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49448] VGAM3535 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3535 was detected is described hereinabove with reference to Figs. 2–8.

[49449] VGAM3535 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pepper ringspot virus. VGAM3535 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49450] VGAM3535 gene, herein designated VGAM GENE, encodes a VGAM3535 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3535 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3535 precursor RNA is designated SEQ ID:79916, and is provided hereinbelow with reference to the sequence listing part.

[49451] VGAM3535 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3535 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49452] An enzyme complex designated DICER COMPLEX, dices the VGAM3535 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3535 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3535 RNA is designated SEQ ID:79917, and is provided hereinbelow with reference to the sequence listing part.

[49453] VGAM3535 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3535 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3535 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49454] VGAM3535 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3535 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3535 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3535 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3535 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49455] The complementary binding of VGAM3535 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3535 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3535 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3535 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49456] It is appreciated that VGAM3535 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3535 host target genes. The mRNA of each one of this plurality of VGAM3535 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3535 RNA, herein designated VGAM

RNA, and which when bound by VGAM3535 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3535 host target proteins.

[49457] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3535 gene, herein designated VGAM GENE, on one or more VGAM3535 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49458] It is yet further appreciated that a function of VGAM3535 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3535 include diagnosis, prevention and treatment of viral infection by Pepper ringspot virus. Specific functions, and accordingly utilities, of VGAM3535 correlate with, and may be deduced from, the identity of the host target genes which VGAM3535 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49459] Nucleotide sequences of the VGAM3535 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3535 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3535 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3535 are further described hereinbelow with reference to Table 1.

[49460] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3535 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49461] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3536 (VGAM3536) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49462] VGAM3536 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3536 was detected is described hereinabove with reference to Figs. 2-8.

[49463] VGAM3536 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 19. VGAM3536 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49464] VGAM3536 gene, herein designated VGAM GENE, encodes a VGAM3536 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3536 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3536 precursor RNA is designated SEQ ID:79920, and is provided hereinbelow with reference to the sequence listing part.

[49465] VGAM3536 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3536 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49466] An enzyme complex designated DICER COMPLEX, dices the VGAM3536 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3536 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3536 RNA is designated SEQ ID:79921, and is provided hereinbelow with reference to the sequence listing part.

[49467] VGAM3536 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3536 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3536 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49468] VGAM3536 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3536 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3536 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3536 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3536 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49469] The complementary binding of VGAM3536 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3536 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3536 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3536 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49470] It is appreciated that VGAM3536 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3536 host target genes. The mRNA of each one of this plurality of VGAM3536 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3536 RNA, herein designated VGAM RNA, and which when bound by VGAM3536 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3536 host target proteins.

[49471] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3536 gene, herein designated VGAM GENE, on one or more VGAM3536 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49472] It is yet further appreciated that a function of VGAM3536 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3536 include diagnosis, prevention and

treatment of viral infection by Human papillomavirus type 19. Specific functions, and accordingly utilities, of VGAM3536 correlate with, and may be deduced from, the identity of the host target genes which VGAM3536 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49473] Nucleotide sequences of the VGAM3536 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3536 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3536 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3536 are further described hereinbelow with reference to Table 1.

[49474] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3536 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49475] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3537 (VGAM3537) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49476] VGAM3537 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3537 was detected is described hereinabove with reference to Figs. 2–8.

[49477] VGAM3537 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 19. VGAM3537 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49478] VGAM3537 gene, herein designated VGAM GENE, encodes a VGAM3537 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3537 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3537 precursor RNA is designated SEQ ID:79928, and is provided hereinbelow with reference to the sequence listing part.

[49479] VGAM3537 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3537 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49480] An enzyme complex designated DICER COMPLEX, dices the VGAM3537 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3537 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3537 RNA is designated SEQ ID:79929, and is provided hereinbelow with reference to the sequence listing part.

[49481] VGAM3537 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3537 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3537 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49482] VGAM3537 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3537 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3537 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3537 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3537 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49483] The complementary binding of VGAM3537 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3537 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3537 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3537 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49484] It is appreciated that VGAM3537 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3537 host target genes. The mRNA of each one of this plurality of VGAM3537 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3537 RNA, herein designated VGAM RNA, and which when bound by VGAM3537 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3537 host target proteins.

[49485] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3537 gene, herein designated VGAM GENE, on one or more VGAM3537 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49486] It is yet further appreciated that a function of VGAM3537 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3537 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type

19. Specific functions, and accordingly utilities, of VGAM3537 correlate with, and may be deduced from, the identity of the host target genes which VGAM3537 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49487] Nucleotide sequences of the VGAM3537 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3537 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3537 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3537 are further described hereinbelow with reference to Table 1.

[49488] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3537 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49489] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3538 (VGAM3538) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[49490] VGAM3538 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3538 was detected is described hereinabove with reference to Figs. 2–8.

[49491] VGAM3538 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 25. VGAM3538 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49492] VGAM3538 gene, herein designated VGAM GENE, encodes a VGAM3538 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3538 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3538 precursor RNA is designated SEQ ID:79936, and is provided hereinbelow with reference to the sequence listing part.

[49493] VGAM3538 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3538 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49494] An enzyme complex designated DICER COMPLEX, dices the VGAM3538 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3538 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3538 RNA is designated SEQ ID:79937, and is provided hereinbelow with reference to the sequence listing part.

[49495] VGAM3538 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3538 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3538 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49496] VGAM3538 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3538 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3538 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3538 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3538 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49497] The complementary binding of VGAM3538 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3538 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3538 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3538 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49498] It is appreciated that VGAM3538 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3538 host target genes. The mRNA of each one of this plurality of VGAM3538 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3538 RNA, herein designated VGAM RNA, and which when bound by VGAM3538 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3538 host target proteins.

[49499] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3538 gene, herein designated VGAM GENE, on one or more VGAM3538 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49500] It is yet further appreciated that a function of VGAM3538 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3538 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 25. Specific functions, and accordingly utilities, of

VGAM3538 correlate with, and may be deduced from, the identity of the host target genes which VGAM3538 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49501] Nucleotide sequences of the VGAM3538 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3538 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3538 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3538 are further described hereinbelow with reference to Table 1.

[49502] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3538 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49503] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3539 (VGAM3539) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[49504] VGAM3539 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3539 was detected is described hereinabove with reference to Figs. 2–8.

[49505] VGAM3539 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 20. VGAM3539 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49506] VGAM3539 gene, herein designated VGAM GENE, encodes a VGAM3539 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3539 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3539 precursor RNA is designated SEQ ID:79963, and is provided hereinbelow with reference to the sequence listing part.

[49507] VGAM3539 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3539 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49508] An enzyme complex designated DICER COMPLEX, dices the VGAM3539 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3539 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3539 RNA is designated SEQ ID:79964, and is provided hereinbelow with reference to the sequence listing part.

[49509] VGAM3539 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3539 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3539 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49510] VGAM3539 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3539 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3539 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3539 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3539 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49511] The complementary binding of VGAM3539 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3539 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3539 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3539 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49512] It is appreciated that VGAM3539 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3539 host target genes. The mRNA of each one of this plurality of VGAM3539 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3539 RNA, herein designated VGAM RNA, and which when bound by VGAM3539 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3539 host target proteins.

[49513] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3539 gene, herein designated VGAM GENE, on one or more VGAM3539 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49514] It is yet further appreciated that a function of VGAM3539 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3539 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 20. Specific functions, and accordingly utilities, of VGAM3539 correlate with, and may be deduced from, the

identity of the host target genes which VGAM3539 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49515] Nucleotide sequences of the VGAM3539 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3539 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3539 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3539 are further described hereinbelow with reference to Table 1.

[49516] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3539 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49517] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3540 (VGAM3540) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49518] VGAM3540 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3540 was detected is described hereinabove with reference to Figs. 2–8.

[49519] VGAM3540 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 23. VGAM3540 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49520] VGAM3540 gene, herein designated VGAM GENE, encodes a VGAM3540 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3540 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3540 precursor RNA is designated SEQ ID:80370, and is provided hereinbelow with reference to the sequence listing part.

[49521] VGAM3540 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3540 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49522] An enzyme complex designated DICER COMPLEX, dices the VGAM3540 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3540 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3540 RNA is designated SEQ ID:80371, and is provided hereinbelow with reference to the sequence listing part.

[49523] VGAM3540 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3540 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3540 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49524] VGAM3540 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3540 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3540 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3540 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3540 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49525] The complementary binding of VGAM3540 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3540 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3540 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3540 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49526] It is appreciated that VGAM3540 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3540 host target genes. The mRNA of each one of this plurality of VGAM3540 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3540 RNA, herein designated VGAM RNA, and which when bound by VGAM3540 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3540 host target proteins.

[49527] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3540 gene, herein designated VGAM GENE, on one or more VGAM3540 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49528] It is yet further appreciated that a function of VGAM3540 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3540 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 23. Specific functions, and accordingly utilities, of VGAM3540 correlate with, and may be deduced from, the identity of the host target genes which VGAM3540 binds

and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49529] Nucleotide sequences of the VGAM3540 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3540 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3540 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3540 are further described hereinbelow with reference to Table 1.

[49530] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3540 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49531] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3541 (VGAM3541) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49532] VGAM3541 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3541 was detected is described hereinabove with reference to Figs. 2–8.

[49533] VGAM3541 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 36. VGAM3541 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49534] VGAM3541 gene, herein designated VGAM GENE, encodes a VGAM3541 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3541 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3541 precursor RNA is designated SEQ ID:80374, and is provided hereinbelow with reference to the sequence listing part.

[49535] VGAM3541 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3541 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49536] An enzyme complex designated DICER COMPLEX, dices the VGAM3541 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3541 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3541 RNA is designated SEQ ID:80375, and is provided hereinbelow with reference to the sequence listing part.

[49537] VGAM3541 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3541 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3541 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49538] VGAM3541 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3541 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3541 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3541 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3541 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[49539] The complementary binding of VGAM3541 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3541 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3541 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3541 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49540] It is appreciated that VGAM3541 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3541 host target genes. The mRNA of each one of this plurality of VGAM3541 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3541 RNA, herein designated VGAM RNA, and which when bound by VGAM3541 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3541 host target proteins.

[49541] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3541 gene, herein designated VGAM GENE, on one or more VGAM3541 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49542] It is yet further appreciated that a function of VGAM3541 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3541 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 36. Specific functions, and accordingly utilities, of VGAM3541 correlate with, and may be deduced from, the identity of the host target genes which VGAM3541 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[49543] Nucleotide sequences of the VGAM3541 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3541 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3541 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3541 are further described hereinbelow with reference to Table 1.

[49544] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3541 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49545] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3542 (VGAM3542) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49546] VGAM3542 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3542 was detected is described hereinabove with reference to Figs. 2–8.

[49547] VGAM3542 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 49. VGAM3542 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49548] VGAM3542 gene, herein designated VGAM GENE, encodes a VGAM3542 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3542 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3542 precursor RNA is designated SEQ ID:80390, and is provided hereinbelow with reference to the sequence listing part.

[49549] VGAM3542 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3542 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49550] An enzyme complex designated DICER COMPLEX, dices the VGAM3542 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3542 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3542 RNA is designated SEQ ID:80391, and is provided hereinbelow with reference to the sequence listing part.

[49551] VGAM3542 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3542 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3542 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[49552] VGAM3542 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3542 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3542 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3542 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3542 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49553] The complementary binding of VGAM3542 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3542 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3542 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3542 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49554] It is appreciated that VGAM3542 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3542 host target genes. The mRNA of each one of this plurality of VGAM3542 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3542 RNA, herein designated VGAM RNA, and which when bound by VGAM3542 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3542 host target proteins.

[49555] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3542 gene, herein designated VGAM GENE, on one

or more VGAM3542 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49556] It is yet further appreciated that a function of VGAM3542 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3542 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 49. Specific functions, and accordingly utilities, of VGAM3542 correlate with, and may be deduced from, the identity of the host target genes which VGAM3542 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49557] Nucleotide sequences of the VGAM3542 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3542 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3542 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3542 are further described hereinbelow with reference to Table 1.

[49558] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3542 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49559] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3543 (VGAM3543) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49560] VGAM3543 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3543 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[49561] VGAM3543 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 9. VGAM3543 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49562] VGAM3543 gene, herein designated VGAM GENE, encodes a VGAM3543 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3543 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3543 precursor RNA is designated SEQ ID:80397, and is provided hereinbelow with reference to the sequence listing part.

[49563] VGAM3543 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3543 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49564] An enzyme complex designated DICER COMPLEX, dices the VGAM3543 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3543 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3543 RNA is designated SEQ ID:80398, and is provided hereinbelow with reference to the sequence listing part.

[49565] VGAM3543 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3543 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3543 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49566] VGAM3543 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3543 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3543 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3543 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3543 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49567] The complementary binding of VGAM3543 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3543 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3543 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3543 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49568] It is appreciated that VGAM3543 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3543 host target genes. The mRNA of each one of this plurality of VGAM3543 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3543 RNA, herein designated VGAM RNA, and which when bound by VGAM3543 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3543 host target proteins.

[49569] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3543 gene, herein designated VGAM GENE, on one or more VGAM3543 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49570] It is yet further appreciated that a function of VGAM3543 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3543 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 9. Specific functions, and accordingly utilities, of VGAM3543 correlate with, and may be deduced from, the identity of the host target genes which VGAM3543 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49571] Nucleotide sequences of the VGAM3543 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3543 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3543 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3543 are further described hereinbelow with reference to Table 1.

[49572] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3543 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49573] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3544 (VGAM3544) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49574] VGAM3544 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3544 was detected is described hereinabove with reference to Figs. 2-8.

[49575] VGAM3544 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3544 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49576] VGAM3544 gene, herein designated VGAM GENE, encodes a VGAM3544 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3544 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3544 precursor RNA is designated SEQ ID:80405, and is provided hereinbelow with reference to the sequence listing part.

[49577] VGAM3544 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3544 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[49578] An enzyme complex designated DICER COMPLEX, dices the VGAM3544 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3544 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3544 RNA is designated SEQ ID:80406, and is provided hereinbelow with reference to the sequence listing part.

[49579] VGAM3544 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3544 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3544 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49580] VGAM3544 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3544 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3544 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3544 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3544 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49581] The complementary binding of VGAM3544 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3544 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3544 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3544 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49582] It is appreciated that VGAM3544 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3544 host target genes. The mRNA of each one of this plurality of VGAM3544 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3544 RNA, herein designated VGAM RNA, and which when bound by VGAM3544 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3544 host target proteins.

[49583] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3544 gene, herein designated VGAM GENE, on one or more VGAM3544 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49584] It is yet further appreciated that a function of VGAM3544 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3544 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3544 correlate with, and may be deduced from, the identity of the host target genes which VGAM3544 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49585] Nucleotide sequences of the VGAM3544 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3544 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3544 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3544 are further described hereinbelow with reference to Table 1.

[49586] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3544 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49587] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3545 (VGAM3545) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49588] VGAM3545 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3545 was detected is described hereinabove with reference to Figs. 2-8.

[49589] VGAM3545 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Human herpesvirus 4. VGAM3545 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49590] VGAM3545 gene, herein designated VGAM GENE, encodes a VGAM3545 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3545 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3545 precursor RNA is designated SEQ ID:80412, and is provided hereinbelow with reference to the sequence listing part.

[49591] VGAM3545 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3545 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49592] An enzyme complex designated DICER COMPLEX, dices the VGAM3545 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3545 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3545 RNA is designated SEQ ID:80413, and is provided hereinbelow with reference to the sequence listing part.

[49593] VGAM3545 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3545 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3545 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49594] VGAM3545 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3545 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3545 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3545 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3545 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49595] The complementary binding of VGAM3545 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3545 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3545 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3545 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49596] It is appreciated that VGAM3545 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3545 host target genes. The mRNA of each one of this plurality of VGAM3545 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3545 RNA, herein designated VGAM RNA, and which when bound by VGAM3545 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3545 host target proteins.

[49597] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3545 gene, herein designated VGAM GENE, on one or more VGAM3545 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49598] It is yet further appreciated that a function of VGAM3545 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3545 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3545 correlate with, and may be deduced from, the identity of the host target genes which VGAM3545 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49599] Nucleotide sequences of the VGAM3545 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3545 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3545 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3545 are further described hereinbelow with reference to Table 1.

[49600] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3545 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49601] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3546 (VGAM3546) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49602] VGAM3546 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3546 was detected is described hereinabove with reference to Figs. 2-8.

[49603] VGAM3546 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1.

VGAM3546 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49604] VGAM3546 gene, herein designated VGAM GENE, encodes a VGAM3546 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3546 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3546 precursor RNA is designated SEQ ID:80442, and is provided hereinbelow with reference to the sequence listing part.

[49605] VGAM3546 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3546 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49606] An enzyme complex designated DICER COMPLEX, dices

the VGAM3546 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3546 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3546 RNA is designated SEQ ID:80443, and is provided hereinbelow with reference to the sequence listing part.

[49607] VGAM3546 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3546 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3546 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49608] VGAM3546 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3546 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3546 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3546 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3546 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49609] The complementary binding of VGAM3546 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3546 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3546 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3546 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49610] It is appreciated that VGAM3546 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3546 host target genes. The mRNA of each one of this plurality of VGAM3546 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3546 RNA, herein designated VGAM RNA, and which when bound by VGAM3546 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3546 host target proteins.

[49611] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3546 gene, herein designated VGAM GENE, on one or more VGAM3546 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49612] It is yet further appreciated that a function of VGAM3546 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3546 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3546 correlate with, and may be deduced from, the identity of the host target genes which VGAM3546 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49613] Nucleotide sequences of the VGAM3546 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3546 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3546 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3546 are further described hereinbelow with reference to Table 1.

[49614] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3546 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49615] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3547 (VGAM3547) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49616] VGAM3547 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3547 was detected is described hereinabove with reference to Figs. 2-8.

[49617] VGAM3547 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Aleutian mink disease virus. VGAM3547 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49618] VGAM3547 gene, herein designated VGAM GENE, encodes a VGAM3547 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3547 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3547 precursor RNA is designated SEQ ID:80470, and is provided hereinbelow with reference to the sequence listing part.

[49619] VGAM3547 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3547 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49620] An enzyme complex designated DICER COMPLEX, dices the VGAM3547 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3547 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3547 RNA is designated SEQ ID:80471, and is provided hereinbelow with reference to the sequence listing part.

[49621] VGAM3547 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3547 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3547 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49622] VGAM3547 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3547 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3547 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3547 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3547 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49623] The complementary binding of VGAM3547 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3547 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3547

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3547 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49624] It is appreciated that VGAM3547 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3547 host target genes. The mRNA of each one of this plurality of VGAM3547 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3547 RNA, herein designated VGAM RNA, and which when bound by VGAM3547 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3547 host target proteins.

[49625] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3547 gene, herein designated VGAM GENE, on one or more VGAM3547 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49626] It is yet further appreciated that a function of VGAM3547 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3547 include diagnosis, prevention and treatment of viral infection by Aleutian mink disease virus. Specific functions, and accordingly utilities, of VGAM3547 correlate with, and may be deduced from, the identity of the host target genes which VGAM3547 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49627] Nucleotide sequences of the VGAM3547 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3547 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3547 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3547 are further described hereinbelow with reference to Table 1.

[49628] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3547 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49629] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3548 (VGAM3548) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49630] VGAM3548 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3548 was detected is described hereinabove with reference to Figs. 2-8.

[49631] VGAM3548 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3548 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[49632] VGAM3548 gene, herein designated VGAM GENE, encodes a VGAM3548 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3548 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3548 precursor RNA is designated SEQ ID:80486, and is provided hereinbelow with reference to the sequence listing part.

[49633] VGAM3548 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3548 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49634] An enzyme complex designated DICER COMPLEX, dices the VGAM3548 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3548 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3548 RNA is designated SEQ ID:80487, and is provided hereinbelow with reference to the sequence listing part.

[49635] VGAM3548 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3548 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3548 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49636] VGAM3548 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3548 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3548 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3548 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3548 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49637] The complementary binding of VGAM3548 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3548 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3548 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3548 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49638] It is appreciated that VGAM3548 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3548 host target genes. The mRNA of each one of this plurality of VGAM3548 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3548 RNA, herein designated VGAM RNA, and which when bound by VGAM3548 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3548 host target proteins.

[49639] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3548 gene, herein designated VGAM GENE, on one or more VGAM3548 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49640] It is yet further appreciated that a function of VGAM3548 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3548 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3548 correlate with, and may be deduced from, the identity of the host target genes which VGAM3548 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49641] Nucleotide sequences of the VGAM3548 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3548 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3548 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3548 are further

described hereinbelow with reference to Table 1.

[49642] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3548 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49643] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3549 (VGAM3549) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49644] VGAM3549 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3549 was detected is described hereinabove with reference to Figs. 2-8.

[49645] VGAM3549 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Banana mild mosaic virus. VGAM3549 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49646] VGAM3549 gene, herein designated VGAM GENE, encodes a VGAM3549 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3549 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3549 precursor RNA is designated SEQ ID:80494, and is provided hereinbelow with reference to the sequence listing part.

[49647] VGAM3549 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3549 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49648] An enzyme complex designated DICER COMPLEX, dices the VGAM3549 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3549 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3549 RNA is designated SEQ ID:80495, and is provided hereinbelow with reference to the sequence listing part.

[49649] VGAM3549 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3549 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3549 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49650] VGAM3549 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3549 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3549 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3549 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3549 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49651] The complementary binding of VGAM3549 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3549 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3549 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3549 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49652] It is appreciated that VGAM3549 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3549 host target genes. The mRNA of each one of this plurality of VGAM3549 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3549 RNA, herein designated VGAM RNA, and which when bound by VGAM3549 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3549 host target proteins.

[49653] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3549 gene, herein designated VGAM GENE, on one or more VGAM3549 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49654] It is yet further appreciated that a function of VGAM3549 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3549 include diagnosis, prevention and treatment of viral infection by Banana mild mosaic virus. Specific functions, and accordingly utilities, of VGAM3549 correlate with, and may be deduced from, the identity of the host target genes which VGAM3549 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49655] Nucleotide sequences of the VGAM3549 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3549 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3549 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3549 are further described hereinbelow with reference to Table 1.

[49656] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3549 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49657] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3550 (VGAM3550) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49658] VGAM3550 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3550 was detected is described hereinabove with reference to Figs. 2-8.

[49659] VGAM3550 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Porcine adenovirus C. VGAM3550 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49660] VGAM3550 gene, herein designated VGAM GENE, encodes

a VGAM3550 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3550 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3550 precursor RNA is designated SEQ ID:80504, and is provided hereinbelow with reference to the sequence listing part.

[49661] VGAM3550 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3550 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49662] An enzyme complex designated DICER COMPLEX, dices the VGAM3550 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3550 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3550 RNA is designated SEQ ID:80505, and is provided hereinbelow with reference to the sequence listing part.

[49663] VGAM3550 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3550 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3550 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49664] VGAM3550 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3550 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3550 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3550 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3550 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49665] The complementary binding of VGAM3550 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3550 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3550 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3550 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[49666] It is appreciated that VGAM3550 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3550 host target genes. The mRNA of each one of this plurality of VGAM3550 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3550 RNA, herein designated VGAM RNA, and which when bound by VGAM3550 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3550 host target proteins.

[49667] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3550 gene, herein designated VGAM GENE, on one or more VGAM3550 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49668] It is yet further appreciated that a function of VGAM3550 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3550 include diagnosis, prevention and treatment of viral infection by Porcine adenovirus C. Specific functions, and accordingly utilities, of VGAM3550 correlate with, and may be deduced from, the identity of the host target genes which VGAM3550 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49669] Nucleotide sequences of the VGAM3550 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3550 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3550 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3550 are further described hereinbelow with reference to Table 1.

[49670] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3550 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49671] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3551 (VGAM3551) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49672] VGAM3551 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3551 was detected is described hereinabove with reference to Figs. 2-8.

[49673] VGAM3551 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3551 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49674] VGAM3551 gene, herein designated VGAM GENE, encodes a VGAM3551 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3551 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3551 precursor RNA is designated SEQ ID:80532, and is provided hereinbelow with reference to the sequence listing part.

[49675] VGAM3551 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3551 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49676] An enzyme complex designated DICER COMPLEX, dices the VGAM3551 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3551 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3551 RNA is designated SEQ ID:80533, and is provided hereinbelow with reference to the sequence listing part.

[49677] VGAM3551 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3551 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3551 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49678] VGAM3551 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3551 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3551 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3551 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3551 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49679] The complementary binding of VGAM3551 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3551 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3551 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3551 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49680] It is appreciated that VGAM3551 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3551 host target genes. The mRNA of each one of this plurality of VGAM3551 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3551 RNA, herein designated VGAM RNA, and which when bound by VGAM3551 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3551 host target proteins.

[49681] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3551 gene, herein designated VGAM GENE, on one or more VGAM3551 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49682] It is yet further appreciated that a function of VGAM3551 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3551 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3551 correlate with, and may be deduced from, the identity of the host target genes which VGAM3551 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49683] Nucleotide sequences of the VGAM3551 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3551 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3551 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3551 are further described hereinbelow with reference to Table 1.

[49684] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3551 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49685] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3552 (VGAM3552) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49686] VGAM3552 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3552 was detected is described hereinabove with reference to Figs. 2-8.

[49687] VGAM3552 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3552 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49688] VGAM3552 gene, herein designated VGAM GENE, encodes a VGAM3552 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3552 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3552 precursor RNA is designated SEQ ID:80537, and is provided hereinbelow with reference to the sequence listing part.

[49689] VGAM3552 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3552 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49690] An enzyme complex designated DICER COMPLEX, dices the VGAM3552 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3552 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3552 RNA is designated SEQ ID:80538, and is provided hereinbelow with reference to the sequence listing part.

[49691] VGAM3552 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3552 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3552 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49692] VGAM3552 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3552 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3552 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3552 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3552 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49693] The complementary binding of VGAM3552 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3552 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3552 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3552 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49694] It is appreciated that VGAM3552 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3552 host target genes. The mRNA of each one of this plurality of VGAM3552 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3552 RNA, herein designated VGAM RNA, and which when bound by VGAM3552 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3552 host target proteins.

[49695] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3552 gene, herein designated VGAM GENE, on one or more VGAM3552 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49696] It is yet further appreciated that a function of VGAM3552 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3552 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3552 correlate with, and may be deduced from, the identity of the host target genes which VGAM3552 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49697] Nucleotide sequences of the VGAM3552 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3552 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3552 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3552 are further described hereinbelow with reference to Table 1.

[49698] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3552 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49699] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3553 (VGAM3553) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49700] VGAM3553 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3553 was detected is described hereinabove with reference to Figs. 2–8.

[49701] VGAM3553 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus A. VGAM3553 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49702] VGAM3553 gene, herein designated VGAM GENE, encodes a VGAM3553 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3553 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3553 precursor RNA is designated SEQ ID:80555, and is provided hereinbelow with reference to the sequence listing part.

[49703] VGAM3553 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3553 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49704] An enzyme complex designated DICER COMPLEX, dices the VGAM3553 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3553 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3553 RNA is designated SEQ ID:80556, and is provided hereinbelow with reference to the sequence listing part.

[49705] VGAM3553 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3553 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3553 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49706] VGAM3553 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3553 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3553 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3553 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3553 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49707] The complementary binding of VGAM3553 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3553 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3553 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3553 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49708] It is appreciated that VGAM3553 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3553 host target genes. The mRNA of each one of this plurality of VGAM3553 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3553 RNA, herein designated VGAM RNA, and which when bound by VGAM3553 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3553 host target proteins.

[49709] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3553 gene, herein designated VGAM GENE, on one or more VGAM3553 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[49710] It is yet further appreciated that a function of VGAM3553 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3553 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus A. Specific functions, and accordingly utilities, of VGAM3553 correlate with, and may be deduced from, the identity of the host target genes which VGAM3553 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49711] Nucleotide sequences of the VGAM3553 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3553 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3553 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3553 are further described hereinbelow with reference to Table 1.

[49712] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3553 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49713] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3554 (VGAM3554) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49714] VGAM3554 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3554 was detected is described hereinabove with reference to Figs. 2-8.

[49715] VGAM3554 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3554 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49716] VGAM3554 gene, herein designated VGAM GENE, encodes a VGAM3554 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3554 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3554 precursor RNA is designated SEQ ID:80565, and is provided hereinbelow with reference to the sequence listing part.

[49717] VGAM3554 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3554 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49718] An enzyme complex designated DICER COMPLEX, dices the VGAM3554 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3554 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide se-

quence of VGAM3554 RNA is designated SEQ ID:80566, and is provided hereinbelow with reference to the sequence listing part.

[49719] VGAM3554 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3554 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3554 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49720] VGAM3554 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3554 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3554 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3554 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3554 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49721] The complementary binding of VGAM3554 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3554 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3554 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3554 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49722] It is appreciated that VGAM3554 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3554 host target genes. The mRNA of

each one of this plurality of VGAM3554 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3554 RNA, herein designated VGAM RNA, and which when bound by VGAM3554 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3554 host target proteins.

[49723] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3554 gene, herein designated VGAM GENE, on one or more VGAM3554 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[49724] It is yet further appreciated that a function of VGAM3554 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3554 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3554 correlate with, and may be deduced from, the identity of the host target genes which VGAM3554 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49725] Nucleotide sequences of the VGAM3554 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3554 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3554 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3554 are further described hereinbelow with reference to Table 1.

[49726] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3554 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[49727] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3555 (VGAM3555) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49728] VGAM3555 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3555 was detected is described hereinabove with reference to Figs. 2–8.

[49729] VGAM3555 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3555 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49730] VGAM3555 gene, herein designated VGAM GENE, encodes a VGAM3555 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3555 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3555 precursor RNA is designated SEQ ID:80574, and is provided hereinbelow with reference to the sequence listing part.

[49731] VGAM3555 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3555 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49732] An enzyme complex designated DICER COMPLEX, dices the VGAM3555 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3555 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3555 RNA is designated SEQ ID:80575,

and is provided hereinbelow with reference to the sequence listing part.

[49733] VGAM3555 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3555 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3555 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49734] VGAM3555 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3555 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3555 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3555 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3555 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49735] The complementary binding of VGAM3555 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3555 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3555 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3555 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49736] It is appreciated that VGAM3555 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3555 host target genes. The mRNA of each one of this plurality of VGAM3555 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3555 RNA, herein designated VGAM RNA, and which when bound by VGAM3555 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3555 host target proteins.

[49737] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3555 gene, herein designated VGAM GENE, on one or more VGAM3555 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49738] It is yet further appreciated that a function of VGAM3555 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3555 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3555 correlate with, and may be deduced from, the identity of the host target genes which VGAM3555 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49739] Nucleotide sequences of the VGAM3555 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3555 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3555 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3555 are further described hereinbelow with reference to Table 1.

[49740] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3555 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49741] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3556 (VGAM3556) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49742] VGAM3556 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3556 was detected is described hereinabove with reference to Figs. 2–8.

[49743] VGAM3556 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus. VGAM3556 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49744] VGAM3556 gene, herein designated VGAM GENE, encodes a VGAM3556 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3556 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3556 precu-

sor RNA is designated SEQ ID:80578, and is provided hereinbelow with reference to the sequence listing part.

[49745] VGAM3556 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3556 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49746] An enzyme complex designated DICER COMPLEX, dices the VGAM3556 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3556 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3556 RNA is designated SEQ ID:80579, and is provided hereinbelow with reference to the se-

quence listing part.

[49747] VGAM3556 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3556 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3556 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49748] VGAM3556 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3556 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3556 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3556 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3556 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49749] The complementary binding of VGAM3556 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3556 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3556 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3556 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49750] It is appreciated that VGAM3556 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3556 host target genes. The mRNA of each one of this plurality of VGAM3556 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3556 RNA, herein designated VGAM RNA, and which when bound by VGAM3556 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3556 host target proteins.

[49751] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3556 gene, herein designated VGAM GENE, on one or more VGAM3556 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49752] It is yet further appreciated that a function of VGAM3556

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3556 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3556 correlate with, and may be deduced from, the identity of the host target genes which VGAM3556 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49753] Nucleotide sequences of the VGAM3556 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3556 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3556 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3556 are further described hereinbelow with reference to Table 1.

[49754] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3556 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49755] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3557 (VGAM3557) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49756] VGAM3557 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3557 was detected is described hereinabove with reference to Figs. 2–8.

[49757] VGAM3557 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Banna virus. VGAM3557 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49758] VGAM3557 gene, herein designated VGAM GENE, encodes a VGAM3557 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3557 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3557 precursor RNA is designated SEQ ID:80592, and is provided hereinbelow with reference to the sequence listing part.

[49759] VGAM3557 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3557 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49760] An enzyme complex designated DICER COMPLEX, dices the VGAM3557 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3557 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3557 RNA is designated SEQ ID:80593, and is provided hereinbelow with reference to the sequence listing part.

[49761] VGAM3557 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3557 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3557 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49762] VGAM3557 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3557 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3557 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3557 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3557 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49763] The complementary binding of VGAM3557 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3557 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3557 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3557 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49764] It is appreciated that VGAM3557 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3557 host target genes. The mRNA of each one of this plurality of VGAM3557 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3557 RNA, herein designated VGAM

RNA, and which when bound by VGAM3557 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3557 host target proteins.

[49765] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3557 gene, herein designated VGAM GENE, on one or more VGAM3557 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49766] It is yet further appreciated that a function of VGAM3557 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3557 include diagnosis, prevention and treatment of viral infection by Banna virus. Specific functions, and accordingly utilities, of VGAM3557 correlate with, and may be deduced from, the identity of the host target genes which VGAM3557 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49767] Nucleotide sequences of the VGAM3557 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3557 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3557 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3557 are further described hereinbelow with reference to Table 1.

[49768] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3557 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49769] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3558 (VGAM3558) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49770] VGAM3558 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3558 was detected is described hereinabove with reference to Figs. 2-8.

[49771] VGAM3558 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2. VGAM3558 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49772] VGAM3558 gene, herein designated VGAM GENE, encodes a VGAM3558 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3558 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3558 precursor RNA is designated SEQ ID:80603, and is provided hereinbelow with reference to the sequence listing part.

[49773] VGAM3558 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3558 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49774] An enzyme complex designated DICER COMPLEX, dices the VGAM3558 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3558 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3558 RNA is designated SEQ ID:80604, and is provided hereinbelow with reference to the sequence listing part.

[49775] VGAM3558 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3558 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3558 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49776] VGAM3558 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3558 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3558 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3558 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3558 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49777] The complementary binding of VGAM3558 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3558 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3558 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3558 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49778] It is appreciated that VGAM3558 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3558 host target genes. The mRNA of each one of this plurality of VGAM3558 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3558 RNA, herein designated VGAM RNA, and which when bound by VGAM3558 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3558 host target proteins.

[49779] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3558 gene, herein designated VGAM GENE, on one or more VGAM3558 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49780] It is yet further appreciated that a function of VGAM3558 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3558 include diagnosis, prevention and

treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3558 correlate with, and may be deduced from, the identity of the host target genes which VGAM3558 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49781] Nucleotide sequences of the VGAM3558 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3558 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3558 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3558 are further described hereinbelow with reference to Table 1.

[49782] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3558 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49783] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3559 (VGAM3559) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49784] VGAM3559 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3559 was detected is described hereinabove with reference to Figs. 2–8.

[49785] VGAM3559 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3559 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49786] VGAM3559 gene, herein designated VGAM GENE, encodes a VGAM3559 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3559 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3559 precursor RNA is designated SEQ ID:80614, and is provided hereinbelow with reference to the sequence listing part.

[49787] VGAM3559 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3559 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49788] An enzyme complex designated DICER COMPLEX, dices the VGAM3559 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3559 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3559 RNA is designated SEQ ID:80615, and is provided hereinbelow with reference to the sequence listing part.

[49789] VGAM3559 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3559 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3559 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49790] VGAM3559 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3559 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3559 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3559 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3559 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49791] The complementary binding of VGAM3559 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3559 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3559 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3559 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49792] It is appreciated that VGAM3559 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3559 host target genes. The mRNA of each one of this plurality of VGAM3559 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3559 RNA, herein designated VGAM RNA, and which when bound by VGAM3559 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3559 host target proteins.

[49793] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3559 gene, herein designated VGAM GENE, on one or more VGAM3559 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49794] It is yet further appreciated that a function of VGAM3559 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3559 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific

functions, and accordingly utilities, of VGAM3559 correlate with, and may be deduced from, the identity of the host target genes which VGAM3559 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49795] Nucleotide sequences of the VGAM3559 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3559 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3559 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3559 are further described hereinbelow with reference to Table 1.

[49796] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3559 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49797] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3560 (VGAM3560) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[49798] VGAM3560 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3560 was detected is described hereinabove with reference to Figs. 2–8.

[49799] VGAM3560 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3560 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49800] VGAM3560 gene, herein designated VGAM GENE, encodes a VGAM3560 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3560 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3560 precursor RNA is designated SEQ ID:80632, and is provided hereinbelow with reference to the sequence listing part.

[49801] VGAM3560 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3560 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49802] An enzyme complex designated DICER COMPLEX, dices the VGAM3560 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3560 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3560 RNA is designated SEQ ID:80633, and is provided hereinbelow with reference to the sequence listing part.

[49803] VGAM3560 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3560 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3560 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49804] VGAM3560 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3560 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3560 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3560 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3560 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49805] The complementary binding of VGAM3560 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3560 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3560 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3560 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49806] It is appreciated that VGAM3560 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3560 host target genes. The mRNA of each one of this plurality of VGAM3560 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3560 RNA, herein designated VGAM RNA, and which when bound by VGAM3560 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3560 host target proteins.

[49807] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3560 gene, herein designated VGAM GENE, on one or more VGAM3560 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49808] It is yet further appreciated that a function of VGAM3560 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3560 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of

VGAM3560 correlate with, and may be deduced from, the identity of the host target genes which VGAM3560 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49809] Nucleotide sequences of the VGAM3560 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3560 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3560 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3560 are further described hereinbelow with reference to Table 1.

[49810] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3560 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49811] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3561 (VGAM3561) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[49812] VGAM3561 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3561 was detected is described hereinabove with reference to Figs. 2–8.

[49813] VGAM3561 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3561 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49814] VGAM3561 gene, herein designated VGAM GENE, encodes a VGAM3561 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3561 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3561 precursor RNA is designated SEQ ID:80881, and is provided hereinbelow with reference to the sequence listing part.

[49815] VGAM3561 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3561 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49816] An enzyme complex designated DICER COMPLEX, dices the VGAM3561 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3561 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3561 RNA is designated SEQ ID:80882, and is provided hereinbelow with reference to the sequence listing part.

[49817] VGAM3561 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3561 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3561 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49818] VGAM3561 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3561 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3561 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3561 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3561 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49819] The complementary binding of VGAM3561 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3561 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3561 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3561 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49820] It is appreciated that VGAM3561 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3561 host target genes. The mRNA of each one of this plurality of VGAM3561 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3561 RNA, herein designated VGAM RNA, and which when bound by VGAM3561 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3561 host target proteins.

[49821] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3561 gene, herein designated VGAM GENE, on one or more VGAM3561 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49822] It is yet further appreciated that a function of VGAM3561 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3561 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3561 correlate with, and may be deduced from, the

identity of the host target genes which VGAM3561 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49823] Nucleotide sequences of the VGAM3561 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3561 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3561 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3561 are further described hereinbelow with reference to Table 1.

[49824] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3561 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49825] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3562 (VGAM3562) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49826] VGAM3562 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3562 was detected is described hereinabove with reference to Figs. 2–8.

[49827] VGAM3562 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus. VGAM3562 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49828] VGAM3562 gene, herein designated VGAM GENE, encodes a VGAM3562 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3562 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3562 precursor RNA is designated SEQ ID:80897, and is provided hereinbelow with reference to the sequence listing part.

[49829] VGAM3562 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3562 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49830] An enzyme complex designated DICER COMPLEX, dices the VGAM3562 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3562 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3562 RNA is designated SEQ ID:80898, and is provided hereinbelow with reference to the sequence listing part.

[49831] VGAM3562 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3562 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3562 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49832] VGAM3562 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3562 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3562 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3562 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3562 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49833] The complementary binding of VGAM3562 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3562 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3562 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3562 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49834] It is appreciated that VGAM3562 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3562 host target genes. The mRNA of each one of this plurality of VGAM3562 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3562 RNA, herein designated VGAM RNA, and which when bound by VGAM3562 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3562 host target proteins.

[49835] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3562 gene, herein designated VGAM GENE, on one or more VGAM3562 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49836] It is yet further appreciated that a function of VGAM3562 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3562 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3562 correlate with, and may be deduced from, the identity of the host target genes which VGAM3562 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[49837] Nucleotide sequences of the VGAM3562 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3562 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3562 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3562 are further described hereinbelow with reference to Table 1.

[49838] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3562 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49839] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3563 (VGAM3563) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49840] VGAM3563 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3563 was detected is described hereinabove with reference to Figs. 2–8.

[49841] VGAM3563 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus.

VGAM3563 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49842] VGAM3563 gene, herein designated VGAM GENE, encodes a VGAM3563 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3563 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3563 precursor RNA is designated SEQ ID:80904, and is provided hereinbelow with reference to the sequence listing part.

[49843] VGAM3563 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3563 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49844] An enzyme complex designated DICER COMPLEX, dices the VGAM3563 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3563 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3563 RNA is designated SEQ ID:80905, and is provided hereinbelow with reference to the sequence listing part.

[49845] VGAM3563 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3563 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3563 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49846] VGAM3563 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3563 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3563 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3563 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3563 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[49847] The complementary binding of VGAM3563 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3563 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3563 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3563 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49848] It is appreciated that VGAM3563 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3563 host target genes. The mRNA of each one of this plurality of VGAM3563 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3563 RNA, herein designated VGAM RNA, and which when bound by VGAM3563 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3563 host target proteins.

[49849] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3563 gene, herein designated VGAM GENE, on one or more VGAM3563 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49850] It is yet further appreciated that a function of VGAM3563 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3563 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3563 correlate with, and may be deduced from, the identity of the host target genes which VGAM3563 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[49851] Nucleotide sequences of the VGAM3563 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3563 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3563 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3563 are further described hereinbelow with reference to Table 1.

[49852] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3563 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49853] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3564 (VGAM3564) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49854] VGAM3564 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3564 was detected is described hereinabove with reference to Figs. 2–8.

[49855] VGAM3564 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ophiostoma mitovirus 3a. VGAM3564 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49856] VGAM3564 gene, herein designated VGAM GENE, encodes a VGAM3564 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3564 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3564 precursor RNA is designated SEQ ID:80920, and is provided hereinbelow with reference to the sequence listing part.

[49857] VGAM3564 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3564 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49858] An enzyme complex designated DICER COMPLEX, dices the VGAM3564 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3564 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3564 RNA is designated SEQ ID:80921, and is provided hereinbelow with reference to the sequence listing part.

[49859] VGAM3564 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3564 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3564 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[49860] VGAM3564 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3564 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3564 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3564 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3564 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49861] The complementary binding of VGAM3564 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3564 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3564 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3564 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49862] It is appreciated that VGAM3564 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3564 host target genes. The mRNA of each one of this plurality of VGAM3564 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3564 RNA, herein designated VGAM RNA, and which when bound by VGAM3564 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3564 host target proteins.

[49863] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3564 gene, herein designated VGAM GENE, on one

or more VGAM3564 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49864] It is yet further appreciated that a function of VGAM3564 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3564 include diagnosis, prevention and treatment of viral infection by Ophiostoma mitovirus 3a. Specific functions, and accordingly utilities, of VGAM3564 correlate with, and may be deduced from, the identity of the host target genes which VGAM3564 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49865] Nucleotide sequences of the VGAM3564 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3564 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3564 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3564 are further described hereinbelow with reference to Table 1.

[49866] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3564 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49867] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3565 (VGAM3565) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49868] VGAM3565 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3565 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[49869] VGAM3565 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV–2. VGAM3565 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49870] VGAM3565 gene, herein designated VGAM GENE, encodes a VGAM3565 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3565 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3565 precursor RNA is designated SEQ ID:80938, and is provided hereinbelow with reference to the sequence listing part.

[49871] VGAM3565 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3565 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49872] An enzyme complex designated DICER COMPLEX, dices the VGAM3565 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3565 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3565 RNA is designated SEQ ID:80939, and is provided hereinbelow with reference to the sequence listing part.

[49873] VGAM3565 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3565 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3565 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49874] VGAM3565 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3565 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3565 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3565 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3565 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49875] The complementary binding of VGAM3565 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3565 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3565 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3565 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49876] It is appreciated that VGAM3565 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3565 host target genes. The mRNA of each one of this plurality of VGAM3565 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3565 RNA, herein designated VGAM RNA, and which when bound by VGAM3565 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3565 host target proteins.

[49877] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3565 gene, herein designated VGAM GENE, on one or more VGAM3565 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49878] It is yet further appreciated that a function of VGAM3565 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3565 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3565 correlate with, and may be deduced from, the identity of the host target genes which VGAM3565 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49879] Nucleotide sequences of the VGAM3565 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3565 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3565 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3565 are further described hereinbelow with reference to Table 1.

[49880] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3565 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49881] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3566 (VGAM3566) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49882] VGAM3566 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3566 was detected is described hereinabove with reference to Figs. 2-8.

[49883] VGAM3566 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3566 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49884] VGAM3566 gene, herein designated VGAM GENE, encodes a VGAM3566 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3566 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3566 precursor RNA is designated SEQ ID:80942, and is provided hereinbelow with reference to the sequence listing part.

[49885] VGAM3566 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3566 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[49886] An enzyme complex designated DICER COMPLEX, dices the VGAM3566 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3566 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3566 RNA is designated SEQ ID:80943, and is provided hereinbelow with reference to the sequence listing part.

[49887] VGAM3566 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3566 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3566 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49888] VGAM3566 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3566 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3566 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3566 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3566 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49889] The complementary binding of VGAM3566 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3566 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3566 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3566 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49890] It is appreciated that VGAM3566 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3566 host target genes. The mRNA of each one of this plurality of VGAM3566 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3566 RNA, herein designated VGAM RNA, and which when bound by VGAM3566 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3566 host target proteins.

[49891] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3566 gene, herein designated VGAM GENE, on one or more VGAM3566 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49892] It is yet further appreciated that a function of VGAM3566 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3566 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3566 correlate with, and may be deduced from, the identity of the host target genes which VGAM3566 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49893] Nucleotide sequences of the VGAM3566 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3566 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3566 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3566 are further described hereinbelow with reference to Table 1.

[49894] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3566 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49895] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3567 (VGAM3567) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49896] VGAM3567 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3567 was detected is described hereinabove with reference to Figs. 2-8.

[49897] VGAM3567 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Gallid herpesvirus 3. VGAM3567 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49898] VGAM3567 gene, herein designated VGAM GENE, encodes a VGAM3567 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3567 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3567 precursor RNA is designated SEQ ID:80947, and is provided hereinbelow with reference to the sequence listing part.

[49899] VGAM3567 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3567 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49900] An enzyme complex designated DICER COMPLEX, dices the VGAM3567 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3567 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3567 RNA is designated SEQ ID:80948, and is provided hereinbelow with reference to the sequence listing part.

[49901] VGAM3567 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3567 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3567 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49902] VGAM3567 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3567 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3567 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3567 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3567 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49903] The complementary binding of VGAM3567 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3567 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3567 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3567 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49904] It is appreciated that VGAM3567 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3567 host target genes. The mRNA of each one of this plurality of VGAM3567 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3567 RNA, herein designated VGAM RNA, and which when bound by VGAM3567 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3567 host target proteins.

[49905] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3567 gene, herein designated VGAM GENE, on one or more VGAM3567 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49906] It is yet further appreciated that a function of VGAM3567 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3567 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3567 correlate with, and may be deduced from, the identity of the host target genes which VGAM3567 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49907] Nucleotide sequences of the VGAM3567 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3567 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3567 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3567 are further described hereinbelow with reference to Table 1.

[49908] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3567 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49909] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3568 (VGAM3568) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49910] VGAM3568 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3568 was detected is described hereinabove with reference to Figs. 2-8.

[49911] VGAM3568 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Clover yellow vein virus.

VGAM3568 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49912] VGAM3568 gene, herein designated VGAM GENE, encodes a VGAM3568 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3568 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3568 precursor RNA is designated SEQ ID:80950, and is provided hereinbelow with reference to the sequence listing part.

[49913] VGAM3568 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3568 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49914] An enzyme complex designated DICER COMPLEX, dices

the VGAM3568 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3568 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3568 RNA is designated SEQ ID:80951, and is provided hereinbelow with reference to the sequence listing part.

[49915] VGAM3568 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3568 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3568 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49916] VGAM3568 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3568 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3568 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3568 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3568 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49917] The complementary binding of VGAM3568 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3568 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3568 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3568 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49918] It is appreciated that VGAM3568 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3568 host target genes. The mRNA of each one of this plurality of VGAM3568 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3568 RNA, herein designated VGAM RNA, and which when bound by VGAM3568 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3568 host target proteins.

[49919] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3568 gene, herein designated VGAM GENE, on one or more VGAM3568 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49920] It is yet further appreciated that a function of VGAM3568 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3568 include diagnosis, prevention and treatment of viral infection by Clover yellow vein virus. Specific functions, and accordingly utilities, of VGAM3568 correlate with, and may be deduced from, the identity of the host target genes which VGAM3568 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49921] Nucleotide sequences of the VGAM3568 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3568 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3568 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3568 are further described hereinbelow with reference to Table 1.

[49922] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3568 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49923] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3569 (VGAM3569) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49924] VGAM3569 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3569 was detected is described hereinabove with reference to Figs. 2-8.

[49925] VGAM3569 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3569 host target gene, herein design-

nated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49926] VGAM3569 gene, herein designated VGAM GENE, encodes a VGAM3569 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3569 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3569 precursor RNA is designated SEQ ID:80959, and is provided hereinbelow with reference to the sequence listing part.

[49927] VGAM3569 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3569 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49928] An enzyme complex designated DICER COMPLEX, dices the VGAM3569 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3569 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3569 RNA is designated SEQ ID:80960, and is provided hereinbelow with reference to the sequence listing part.

[49929] VGAM3569 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3569 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3569 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49930] VGAM3569 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3569 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3569 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3569 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3569 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49931] The complementary binding of VGAM3569 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3569 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3569

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3569 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49932] It is appreciated that VGAM3569 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3569 host target genes. The mRNA of each one of this plurality of VGAM3569 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3569 RNA, herein designated VGAM RNA, and which when bound by VGAM3569 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3569 host target proteins.

[49933] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3569 gene, herein designated VGAM GENE, on one or more VGAM3569 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49934] It is yet further appreciated that a function of VGAM3569 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3569 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3569 correlate with, and may be deduced from, the identity of the host target genes which VGAM3569 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49935] Nucleotide sequences of the VGAM3569 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3569 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3569 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3569 are further described hereinbelow with reference to Table 1.

[49936] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3569 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49937] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3570 (VGAM3570) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49938] VGAM3570 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3570 was detected is described hereinabove with reference to Figs. 2-8.

[49939] VGAM3570 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Apple chlorotic leaf spot virus. VGAM3570 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[49940] VGAM3570 gene, herein designated VGAM GENE, encodes a VGAM3570 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3570 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3570 precursor RNA is designated SEQ ID:80969, and is provided hereinbelow with reference to the sequence listing part.

[49941] VGAM3570 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3570 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49942] An enzyme complex designated DICER COMPLEX, dices the VGAM3570 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3570 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3570 RNA is designated SEQ ID:80970, and is provided hereinbelow with reference to the sequence listing part.

[49943] VGAM3570 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3570 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3570 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49944] VGAM3570 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3570 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3570 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3570 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3570 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49945] The complementary binding of VGAM3570 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3570 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3570 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3570 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49946] It is appreciated that VGAM3570 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3570 host target genes. The mRNA of each one of this plurality of VGAM3570 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3570 RNA, herein designated VGAM RNA, and which when bound by VGAM3570 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3570 host target proteins.

[49947] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3570 gene, herein designated VGAM GENE, on one or more VGAM3570 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49948] It is yet further appreciated that a function of VGAM3570 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3570 include diagnosis, prevention and treatment of viral infection by Apple chlorotic leaf spot virus. Specific functions, and accordingly utilities, of VGAM3570 correlate with, and may be deduced from, the identity of the host target genes which VGAM3570 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49949] Nucleotide sequences of the VGAM3570 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3570 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3570 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3570 are further

described hereinbelow with reference to Table 1.

[49950] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3570 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49951] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3571 (VGAM3571) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49952] VGAM3571 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3571 was detected is described hereinabove with reference to Figs. 2-8.

[49953] VGAM3571 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human respiratory syncytial virus. VGAM3571 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49954] VGAM3571 gene, herein designated VGAM GENE, encodes

a VGAM3571 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3571 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3571 precursor RNA is designated SEQ ID:80978, and is provided hereinbelow with reference to the sequence listing part.

[49955] VGAM3571 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3571 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49956] An enzyme complex designated DICER COMPLEX, dices the VGAM3571 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3571 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3571 RNA is designated SEQ ID:80979, and is provided hereinbelow with reference to the sequence listing part.

[49957] VGAM3571 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3571 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3571 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49958] VGAM3571 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3571 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3571 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3571 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3571 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49959] The complementary binding of VGAM3571 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3571 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3571 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3571 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[49960] It is appreciated that VGAM3571 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3571 host target genes. The mRNA of each one of this plurality of VGAM3571 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3571 RNA, herein designated VGAM RNA, and which when bound by VGAM3571 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3571 host target proteins.

[49961] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3571 gene, herein designated VGAM GENE, on one or more VGAM3571 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49962] It is yet further appreciated that a function of VGAM3571 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3571 include diagnosis, prevention and treatment of viral infection by Human respiratory syncytial virus. Specific functions, and accordingly utilities, of VGAM3571 correlate with, and may be deduced from, the identity of the host target genes which VGAM3571 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49963] Nucleotide sequences of the VGAM3571 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3571 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3571 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3571 are further described hereinbelow with reference to Table 1.

[49964] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3571 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49965] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3572 (VGAM3572) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49966] VGAM3572 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3572 was detected is described hereinabove with reference to Figs. 2-8.

[49967] VGAM3572 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Apple latent spherical virus. VGAM3572 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49968] VGAM3572 gene, herein designated VGAM GENE, encodes a VGAM3572 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3572 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3572 precursor RNA is designated SEQ ID:80988, and is provided hereinbelow with reference to the sequence listing part.

[49969] VGAM3572 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3572 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49970] An enzyme complex designated DICER COMPLEX, dices the VGAM3572 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3572 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3572 RNA is designated SEQ ID:80989, and is provided hereinbelow with reference to the sequence listing part.

[49971] VGAM3572 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3572 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3572 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49972] VGAM3572 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3572 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3572 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3572 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3572 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49973] The complementary binding of VGAM3572 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3572 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3572 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3572 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49974] It is appreciated that VGAM3572 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3572 host target genes. The mRNA of each one of this plurality of VGAM3572 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3572 RNA, herein designated VGAM RNA, and which when bound by VGAM3572 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3572 host target proteins.

[49975] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3572 gene, herein designated VGAM GENE, on one or more VGAM3572 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49976] It is yet further appreciated that a function of VGAM3572 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3572 include diagnosis, prevention and treatment of viral infection by Apple latent spherical virus. Specific functions, and accordingly utilities, of VGAM3572 correlate with, and may be deduced from, the identity of the host target genes which VGAM3572 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49977] Nucleotide sequences of the VGAM3572 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3572 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3572 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3572 are further described hereinbelow with reference to Table 1.

[49978] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3572 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49979] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3573 (VGAM3573) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49980] VGAM3573 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3573 was detected is described hereinabove with reference to Figs. 2-8.

[49981] VGAM3573 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3573 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49982] VGAM3573 gene, herein designated VGAM GENE, encodes a VGAM3573 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3573 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3573 precursor RNA is designated SEQ ID:80992, and is provided hereinbelow with reference to the sequence listing part.

[49983] VGAM3573 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3573 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49984] An enzyme complex designated DICER COMPLEX, dices the VGAM3573 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3573 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3573 RNA is designated SEQ ID:80993, and is provided hereinbelow with reference to the sequence listing part.

[49985] VGAM3573 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3573 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3573 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[49986] VGAM3573 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3573 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3573 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3573 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3573 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[49987] The complementary binding of VGAM3573 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3573 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3573 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3573 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[49988] It is appreciated that VGAM3573 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3573 host target genes. The mRNA of each one of this plurality of VGAM3573 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3573 RNA, herein designated VGAM RNA, and which when bound by VGAM3573 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3573 host target proteins.

[49989] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3573 gene, herein designated VGAM GENE, on one or more VGAM3573 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[49990] It is yet further appreciated that a function of VGAM3573 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3573 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3573 correlate with, and may be deduced from, the identity of the host target genes which VGAM3573 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[49991] Nucleotide sequences of the VGAM3573 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3573 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3573 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3573 are further described hereinbelow with reference to Table 1.

[49992] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3573 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[49993] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3574 (VGAM3574) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[49994] VGAM3574 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3574 was detected is described hereinabove with reference to Figs. 2–8.

[49995] VGAM3574 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-1. VGAM3574 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[49996] VGAM3574 gene, herein designated VGAM GENE, encodes a VGAM3574 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3574 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3574 precursor RNA is designated SEQ ID:80999, and is provided hereinbelow with reference to the sequence listing part.

[49997] VGAM3574 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3574 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[49998] An enzyme complex designated DICER COMPLEX, dices the VGAM3574 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3574 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3574 RNA is designated SEQ ID:81000, and is provided hereinbelow with reference to the sequence listing part.

[49999] VGAM3574 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3574 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3574 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50000] VGAM3574 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3574 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3574 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3574 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3574 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50001] The complementary binding of VGAM3574 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3574 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3574 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3574 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50002] It is appreciated that VGAM3574 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3574 host target genes. The mRNA of each one of this plurality of VGAM3574 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3574 RNA, herein designated VGAM RNA, and which when bound by VGAM3574 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3574 host target proteins.

[50003] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3574 gene, herein designated VGAM GENE, on one or more VGAM3574 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [50004] It is yet further appreciated that a function of VGAM3574 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3574 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-1. Specific functions, and accordingly utilities, of VGAM3574 correlate with, and may be deduced from, the identity of the host target genes which VGAM3574 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [50005] Nucleotide sequences of the VGAM3574 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3574 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3574 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3574 are further described hereinbelow with reference to Table 1.
- [50006] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3574 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50007] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3575 (VGAM3575) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50008] VGAM3575 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3575 was detected is described hereinabove with reference to Figs. 2-8.

[50009] VGAM3575 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ovine adenovirus A. VGAM3575 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50010] VGAM3575 gene, herein designated VGAM GENE, encodes a VGAM3575 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3575 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3575 precursor RNA is designated SEQ ID:81003, and is provided hereinbelow with reference to the sequence listing part.

[50011] VGAM3575 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3575 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50012] An enzyme complex designated DICER COMPLEX, dices the VGAM3575 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3575 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3575 RNA is designated SEQ ID:81004, and is provided hereinbelow with reference to the sequence listing part.

[50013] VGAM3575 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3575 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3575 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50014] VGAM3575 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3575 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3575 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3575 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3575 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50015] The complementary binding of VGAM3575 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3575 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3575 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3575 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50016] It is appreciated that VGAM3575 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3575 host target genes. The mRNA of

each one of this plurality of VGAM3575 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3575 RNA, herein designated VGAM RNA, and which when bound by VGAM3575 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3575 host target proteins.

[50017] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3575 gene, herein designated VGAM GENE, on one or more VGAM3575 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[50018] It is yet further appreciated that a function of VGAM3575 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3575 include diagnosis, prevention and treatment of viral infection by Ovine adenovirus A. Specific functions, and accordingly utilities, of VGAM3575 correlate with, and may be deduced from, the identity of the host target genes which VGAM3575 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50019] Nucleotide sequences of the VGAM3575 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3575 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3575 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3575 are further described hereinbelow with reference to Table 1.

[50020] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3575 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[50021] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3576 (VGAM3576) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50022] VGAM3576 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3576 was detected is described hereinabove with reference to Figs. 2–8.

[50023] VGAM3576 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sugarcane striate mosaic associated virus. VGAM3576 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50024] VGAM3576 gene, herein designated VGAM GENE, encodes a VGAM3576 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3576 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3576 precursor RNA is designated SEQ ID:81018, and is provided hereinbelow with reference to the sequence listing part.

[50025] VGAM3576 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3576 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50026] An enzyme complex designated DICER COMPLEX, dices the VGAM3576 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3576 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3576 RNA is designated SEQ ID:81019,

and is provided hereinbelow with reference to the sequence listing part.

[50027] VGAM3576 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3576 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3576 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50028] VGAM3576 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3576 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3576 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3576 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3576 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50029] The complementary binding of VGAM3576 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3576 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3576 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3576 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50030] It is appreciated that VGAM3576 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3576 host target genes. The mRNA of each one of this plurality of VGAM3576 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3576 RNA, herein designated VGAM RNA, and which when bound by VGAM3576 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3576 host target proteins.

[50031] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3576 gene, herein designated VGAM GENE, on one or more VGAM3576 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50032] It is yet further appreciated that a function of VGAM3576 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3576 include diagnosis, prevention and treatment of viral infection by Sugarcane striate mosaic associated virus. Specific functions, and accordingly utilities, of VGAM3576 correlate with, and may be deduced from, the identity of the host target genes which VGAM3576 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50033] Nucleotide sequences of the VGAM3576 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3576 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3576 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3576 are further described hereinbelow with reference to Table 1.

[50034] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3576 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50035] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3577 (VGAM3577) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50036] VGAM3577 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3577 was detected is described hereinabove with reference to Figs. 2–8.

[50037] VGAM3577 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3577 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50038] VGAM3577 gene, herein designated VGAM GENE, encodes a VGAM3577 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3577 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3577 precu-

sor RNA is designated SEQ ID:81049, and is provided hereinbelow with reference to the sequence listing part.

[50039] VGAM3577 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3577 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50040] An enzyme complex designated DICER COMPLEX, dices the VGAM3577 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3577 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3577 RNA is designated SEQ ID:81050, and is provided hereinbelow with reference to the se-

quence listing part.

[50041] VGAM3577 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3577 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3577 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50042] VGAM3577 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3577 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3577 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3577 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3577 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50043] The complementary binding of VGAM3577 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3577 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3577 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3577 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50044] It is appreciated that VGAM3577 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3577 host target genes. The mRNA of each one of this plurality of VGAM3577 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3577 RNA, herein designated VGAM RNA, and which when bound by VGAM3577 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3577 host target proteins.

[50045] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3577 gene, herein designated VGAM GENE, on one or more VGAM3577 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50046] It is yet further appreciated that a function of VGAM3577

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3577 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3577 correlate with, and may be deduced from, the identity of the host target genes which VGAM3577 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50047] Nucleotide sequences of the VGAM3577 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3577 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3577 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3577 are further described hereinbelow with reference to Table 1.

[50048] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3577 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50049] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3578 (VGAM3578) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50050] VGAM3578 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3578 was detected is described hereinabove with reference to Figs. 2–8.

[50051] VGAM3578 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cherry necrotic rusty mottle virus. VGAM3578 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50052] VGAM3578 gene, herein designated VGAM GENE, encodes a VGAM3578 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3578 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3578 precursor RNA is designated SEQ ID:81058, and is provided

hereinbelow with reference to the sequence listing part.

[50053] VGAM3578 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3578 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50054] An enzyme complex designated DICER COMPLEX, dices the VGAM3578 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3578 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3578 RNA is designated SEQ ID:81059, and is provided hereinbelow with reference to the sequence listing part.

[50055] VGAM3578 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3578 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3578 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50056] VGAM3578 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3578 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3578 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3578 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3578 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50057] The complementary binding of VGAM3578 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3578 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3578 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3578 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50058] It is appreciated that VGAM3578 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3578 host target genes. The mRNA of each one of this plurality of VGAM3578 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3578 RNA, herein designated VGAM RNA, and which when bound by VGAM3578 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3578 host target proteins.

[50059] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3578 gene, herein designated VGAM GENE, on one or more VGAM3578 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50060] It is yet further appreciated that a function of VGAM3578 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3578 include diagnosis, prevention and treatment of viral infection by Cherry necrotic rusty mottle virus. Specific functions, and accordingly utilities, of VGAM3578 correlate with, and may be deduced from, the identity of the host target genes which VGAM3578 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50061] Nucleotide sequences of the VGAM3578 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3578 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3578 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3578 are further described hereinbelow with reference to Table 1.

[50062] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3578 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50063] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3579 (VGAM3579) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50064] VGAM3579 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3579 was detected is described hereinabove with reference to Figs. 2–8.

[50065] VGAM3579 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Variola virus. VGAM3579 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50066] VGAM3579 gene, herein designated VGAM GENE, encodes a VGAM3579 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3579 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3579 precursor RNA is designated SEQ ID:81069, and is provided hereinbelow with reference to the sequence listing part.

[50067] VGAM3579 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3579 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50068] An enzyme complex designated DICER COMPLEX, dices the VGAM3579 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3579 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3579 RNA is designated SEQ ID:81070, and is provided hereinbelow with reference to the sequence listing part.

[50069] VGAM3579 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3579 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3579 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50070] VGAM3579 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3579 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3579 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3579 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3579 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50071] The complementary binding of VGAM3579 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3579 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3579 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3579 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50072] It is appreciated that VGAM3579 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3579 host target genes. The mRNA of each one of this plurality of VGAM3579 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3579 RNA, herein designated VGAM RNA, and which when bound by VGAM3579 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3579 host target proteins.

[50073] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3579 gene, herein designated VGAM GENE, on one or more VGAM3579 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50074] It is yet further appreciated that a function of VGAM3579 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3579 include diagnosis, prevention and

treatment of viral infection by Variola virus. Specific functions, and accordingly utilities, of VGAM3579 correlate with, and may be deduced from, the identity of the host target genes which VGAM3579 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50075] Nucleotide sequences of the VGAM3579 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3579 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3579 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3579 are further described hereinbelow with reference to Table 1.

[50076] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3579 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50077] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3580 (VGAM3580) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50078] VGAM3580 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3580 was detected is described hereinabove with reference to Figs. 2–8.

[50079] VGAM3580 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 15. VGAM3580 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50080] VGAM3580 gene, herein designated VGAM GENE, encodes a VGAM3580 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3580 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3580 precursor RNA is designated SEQ ID:81076, and is provided hereinbelow with reference to the sequence listing part.

[50081] VGAM3580 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3580 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50082] An enzyme complex designated DICER COMPLEX, dices the VGAM3580 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3580 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3580 RNA is designated SEQ ID:81077, and is provided hereinbelow with reference to the sequence listing part.

[50083] VGAM3580 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3580 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3580 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50084] VGAM3580 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3580 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3580 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3580 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3580 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50085] The complementary binding of VGAM3580 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3580 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3580 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3580 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50086] It is appreciated that VGAM3580 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3580 host target genes. The mRNA of each one of this plurality of VGAM3580 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3580 RNA, herein designated VGAM RNA, and which when bound by VGAM3580 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3580 host target proteins.

[50087] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3580 gene, herein designated VGAM GENE, on one or more VGAM3580 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50088] It is yet further appreciated that a function of VGAM3580 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3580 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type

15. Specific functions, and accordingly utilities, of VGAM3580 correlate with, and may be deduced from, the identity of the host target genes which VGAM3580 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50089] Nucleotide sequences of the VGAM3580 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3580 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3580 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3580 are further described hereinbelow with reference to Table 1.

[50090] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3580 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50091] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3581 (VGAM3581) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[50092] VGAM3581 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3581 was detected is described hereinabove with reference to Figs. 2–8.

[50093] VGAM3581 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3581 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50094] VGAM3581 gene, herein designated VGAM GENE, encodes a VGAM3581 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3581 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3581 precursor RNA is designated SEQ ID:81131, and is provided hereinbelow with reference to the sequence listing part.

[50095] VGAM3581 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3581 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50096] An enzyme complex designated DICER COMPLEX, dices the VGAM3581 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3581 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3581 RNA is designated SEQ ID:81132, and is provided hereinbelow with reference to the sequence listing part.

[50097] VGAM3581 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3581 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3581 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50098] VGAM3581 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3581 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3581 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3581 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3581 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50099] The complementary binding of VGAM3581 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3581 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3581 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3581 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50100] It is appreciated that VGAM3581 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3581 host target genes. The mRNA of each one of this plurality of VGAM3581 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3581 RNA, herein designated VGAM RNA, and which when bound by VGAM3581 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3581 host target proteins.

[50101] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3581 gene, herein designated VGAM GENE, on one or more VGAM3581 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50102] It is yet further appreciated that a function of VGAM3581 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3581 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3581

correlate with, and may be deduced from, the identity of the host target genes which VGAM3581 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50103] Nucleotide sequences of the VGAM3581 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3581 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3581 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3581 are further described hereinbelow with reference to Table 1.

[50104] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3581 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50105] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3582 (VGAM3582) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[50106] VGAM3582 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3582 was detected is described hereinabove with reference to Figs. 2–8.

[50107] VGAM3582 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus. VGAM3582 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50108] VGAM3582 gene, herein designated VGAM GENE, encodes a VGAM3582 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3582 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3582 precursor RNA is designated SEQ ID:81141, and is provided hereinbelow with reference to the sequence listing part.

[50109] VGAM3582 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3582 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50110] An enzyme complex designated DICER COMPLEX, dices the VGAM3582 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3582 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3582 RNA is designated SEQ ID:81142, and is provided hereinbelow with reference to the sequence listing part.

[50111] VGAM3582 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3582 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3582 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50112] VGAM3582 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3582 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3582 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3582 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3582 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50113] The complementary binding of VGAM3582 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3582 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3582 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3582 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50114] It is appreciated that VGAM3582 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3582 host target genes. The mRNA of each one of this plurality of VGAM3582 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3582 RNA, herein designated VGAM RNA, and which when bound by VGAM3582 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3582 host target proteins.

[50115] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3582 gene, herein designated VGAM GENE, on one or more VGAM3582 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50116] It is yet further appreciated that a function of VGAM3582 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3582 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3582 correlate with, and may be deduced from, the identity of the

host target genes which VGAM3582 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50117] Nucleotide sequences of the VGAM3582 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3582 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3582 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3582 are further described hereinbelow with reference to Table 1.

[50118] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3582 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50119] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3583 (VGAM3583) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50120] VGAM3583 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3583 was detected is described hereinabove with reference to Figs. 2–8.

[50121] VGAM3583 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tobacco etch virus. VGAM3583 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50122] VGAM3583 gene, herein designated VGAM GENE, encodes a VGAM3583 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3583 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3583 precursor RNA is designated SEQ ID:81150, and is provided hereinbelow with reference to the sequence listing part.

[50123] VGAM3583 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3583 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50124] An enzyme complex designated DICER COMPLEX, dices the VGAM3583 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3583 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3583 RNA is designated SEQ ID:81151, and is provided hereinbelow with reference to the sequence listing part.

[50125] VGAM3583 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3583 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3583 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50126] VGAM3583 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3583 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3583 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3583 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3583 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50127] The complementary binding of VGAM3583 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3583 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3583 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3583 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50128] It is appreciated that VGAM3583 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3583 host target genes. The mRNA of each one of this plurality of VGAM3583 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3583 RNA, herein designated VGAM RNA, and which when bound by VGAM3583 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3583 host target proteins.

[50129] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3583 gene, herein designated VGAM GENE, on one or more VGAM3583 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50130] It is yet further appreciated that a function of VGAM3583 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3583 include diagnosis, prevention and treatment of viral infection by Tobacco etch virus. Specific functions, and accordingly utilities, of VGAM3583 correlate with, and may be deduced from, the identity of the host target genes which VGAM3583 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[50131] Nucleotide sequences of the VGAM3583 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3583 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3583 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3583 are further described hereinbelow with reference to Table 1.

[50132] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3583 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50133] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3584 (VGAM3584) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50134] VGAM3584 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3584 was detected is described hereinabove with reference to Figs. 2–8.

[50135] VGAM3584 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3584 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50136] VGAM3584 gene, herein designated VGAM GENE, encodes a VGAM3584 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3584 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3584 precursor RNA is designated SEQ ID:81158, and is provided hereinbelow with reference to the sequence listing part.

[50137] VGAM3584 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3584 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50138] An enzyme complex designated DICER COMPLEX, dices the VGAM3584 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3584 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3584 RNA is designated SEQ ID:81159, and is provided hereinbelow with reference to the sequence listing part.

[50139] VGAM3584 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3584 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3584 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50140] VGAM3584 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3584 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3584 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3584 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3584 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[50141] The complementary binding of VGAM3584 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3584 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3584 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3584 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50142] It is appreciated that VGAM3584 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3584 host target genes. The mRNA of each one of this plurality of VGAM3584 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3584 RNA, herein designated VGAM RNA, and which when bound by VGAM3584 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3584 host target proteins.

[50143] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3584 gene, herein designated VGAM GENE, on one or more VGAM3584 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50144] It is yet further appreciated that a function of VGAM3584 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3584 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3584 correlate with, and may be deduced from, the identity of the host target genes which VGAM3584 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[50145] Nucleotide sequences of the VGAM3584 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3584 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3584 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3584 are further described hereinbelow with reference to Table 1.

[50146] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3584 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50147] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3585 (VGAM3585) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50148] VGAM3585 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3585 was detected is described hereinabove with reference to Figs. 2–8.

[50149] VGAM3585 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3585 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50150] VGAM3585 gene, herein designated VGAM GENE, encodes a VGAM3585 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3585 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3585 precursor RNA is designated SEQ ID:81163, and is provided hereinbelow with reference to the sequence listing part.

[50151] VGAM3585 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3585 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50152] An enzyme complex designated DICER COMPLEX, dices the VGAM3585 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3585 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3585 RNA is designated SEQ ID:81164, and is provided hereinbelow with reference to the sequence listing part.

[50153] VGAM3585 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3585 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3585 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[50154] VGAM3585 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3585 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3585 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3585 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3585 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50155] The complementary binding of VGAM3585 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3585 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3585 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3585 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50156] It is appreciated that VGAM3585 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3585 host target genes. The mRNA of each one of this plurality of VGAM3585 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3585 RNA, herein designated VGAM RNA, and which when bound by VGAM3585 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3585 host target proteins.

[50157] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3585 gene, herein designated VGAM GENE, on one

or more VGAM3585 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50158] It is yet further appreciated that a function of VGAM3585 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3585 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3585 correlate with, and may be deduced from, the identity of the host target genes which VGAM3585 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50159] Nucleotide sequences of the VGAM3585 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3585 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3585 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3585 are further described hereinbelow with reference to Table 1.

[50160] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3585 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50161] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3586 (VGAM3586) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50162] VGAM3586 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3586 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[50163] VGAM3586 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Common chimpanzee papillomavirus 1. VGAM3586 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50164] VGAM3586 gene, herein designated VGAM GENE, encodes a VGAM3586 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3586 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3586 precursor RNA is designated SEQ ID:81167, and is provided hereinbelow with reference to the sequence listing part.

[50165] VGAM3586 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3586 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50166] An enzyme complex designated DICER COMPLEX, dices the VGAM3586 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3586 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3586 RNA is designated SEQ ID:81168, and is provided hereinbelow with reference to the sequence listing part.

[50167] VGAM3586 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3586 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3586 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50168] VGAM3586 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3586 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3586 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3586 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3586 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50169] The complementary binding of VGAM3586 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3586 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3586 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3586 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50170] It is appreciated that VGAM3586 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3586 host target genes. The mRNA of each one of this plurality of VGAM3586 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3586 RNA, herein designated VGAM RNA, and which when bound by VGAM3586 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3586 host target proteins.

[50171] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3586 gene, herein designated VGAM GENE, on one or more VGAM3586 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50172] It is yet further appreciated that a function of VGAM3586 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3586 include diagnosis, prevention and treatment of viral infection by Common chimpanzee papillomavirus 1. Specific functions, and accordingly utilities, of VGAM3586 correlate with, and may be deduced from, the identity of the host target genes which VGAM3586 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50173] Nucleotide sequences of the VGAM3586 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3586 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3586 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3586 are further described hereinbelow with reference to Table 1.

[50174] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3586 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50175] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3587 (VGAM3587) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50176] VGAM3587 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3587 was detected is described hereinabove with reference to Figs. 2-8.

[50177] VGAM3587 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3587 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50178] VGAM3587 gene, herein designated VGAM GENE, encodes a VGAM3587 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3587 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3587 precursor RNA is designated SEQ ID:81184, and is provided hereinbelow with reference to the sequence listing part.

[50179] VGAM3587 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3587 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[50180] An enzyme complex designated DICER COMPLEX, dices the VGAM3587 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3587 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3587 RNA is designated SEQ ID:81185, and is provided hereinbelow with reference to the sequence listing part.

[50181] VGAM3587 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3587 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3587 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50182] VGAM3587 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3587 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3587 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3587 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3587 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50183] The complementary binding of VGAM3587 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3587 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3587 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3587 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50184] It is appreciated that VGAM3587 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3587 host target genes. The mRNA of each one of this plurality of VGAM3587 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3587 RNA, herein designated VGAM RNA, and which when bound by VGAM3587 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3587 host target proteins.

[50185] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3587 gene, herein designated VGAM GENE, on one or more VGAM3587 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50186] It is yet further appreciated that a function of VGAM3587 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3587 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3587 correlate with, and may be deduced from, the identity of the host target genes which VGAM3587 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50187] Nucleotide sequences of the VGAM3587 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3587 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3587 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3587 are further described hereinbelow with reference to Table 1.

[50188] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3587 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50189] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3588 (VGAM3588) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50190] VGAM3588 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3588 was detected is described hereinabove with reference to Figs. 2-8.

[50191] VGAM3588 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Camelpox virus.

VGAM3588 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50192] VGAM3588 gene, herein designated VGAM GENE, encodes a VGAM3588 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3588 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3588 precursor RNA is designated SEQ ID:81191, and is provided hereinbelow with reference to the sequence listing part.

[50193] VGAM3588 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3588 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50194] An enzyme complex designated DICER COMPLEX, dices the VGAM3588 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3588 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3588 RNA is designated SEQ ID:81192, and is provided hereinbelow with reference to the sequence listing part.

[50195] VGAM3588 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3588 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3588 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50196] VGAM3588 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3588 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3588 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3588 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3588 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50197] The complementary binding of VGAM3588 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3588 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3588 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3588 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50198] It is appreciated that VGAM3588 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3588 host target genes. The mRNA of each one of this plurality of VGAM3588 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3588 RNA, herein designated VGAM RNA, and which when bound by VGAM3588 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3588 host target proteins.

[50199] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3588 gene, herein designated VGAM GENE, on one or more VGAM3588 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50200] It is yet further appreciated that a function of VGAM3588 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3588 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3588 correlate with, and may be deduced from, the identity of the host target genes which VGAM3588 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50201] Nucleotide sequences of the VGAM3588 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3588 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3588 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3588 are further described hereinbelow with reference to Table 1.

[50202] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3588 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50203] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3589 (VGAM3589) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50204] VGAM3589 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3589 was detected is described hereinabove with reference to Figs. 2-8.

[50205] VGAM3589 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3.

VGAM3589 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50206] VGAM3589 gene, herein designated VGAM GENE, encodes a VGAM3589 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3589 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3589 precursor RNA is designated SEQ ID:81222, and is provided hereinbelow with reference to the sequence listing part.

[50207] VGAM3589 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3589 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50208] An enzyme complex designated DICER COMPLEX, dices

the VGAM3589 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3589 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3589 RNA is designated SEQ ID:81223, and is provided hereinbelow with reference to the sequence listing part.

[50209] VGAM3589 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3589 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3589 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50210] VGAM3589 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3589 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3589 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3589 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3589 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50211] The complementary binding of VGAM3589 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3589 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3589 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3589 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50212] It is appreciated that VGAM3589 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3589 host target genes. The mRNA of each one of this plurality of VGAM3589 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3589 RNA, herein designated VGAM RNA, and which when bound by VGAM3589 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3589 host target proteins.

[50213] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3589 gene, herein designated VGAM GENE, on one or more VGAM3589 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50214] It is yet further appreciated that a function of VGAM3589 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3589 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3589 correlate with, and may be deduced from, the identity of the host target genes which VGAM3589 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50215] Nucleotide sequences of the VGAM3589 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3589 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3589 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3589 are further described hereinbelow with reference to Table 1.

[50216] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3589 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50217] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3590 (VGAM3590) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50218] VGAM3590 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3590 was detected is described hereinabove with reference to Figs. 2-8.

[50219] VGAM3590 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Potato virus Y. VGAM3590 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[50220] VGAM3590 gene, herein designated VGAM GENE, encodes a VGAM3590 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3590 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3590 precursor RNA is designated SEQ ID:81233, and is provided hereinbelow with reference to the sequence listing part.

[50221] VGAM3590 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3590 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50222] An enzyme complex designated DICER COMPLEX, dices the VGAM3590 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3590 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3590 RNA is designated SEQ ID:81234, and is provided hereinbelow with reference to the sequence listing part.

[50223] VGAM3590 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3590 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3590 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50224] VGAM3590 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3590 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3590 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3590 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3590 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50225] The complementary binding of VGAM3590 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3590 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3590

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3590 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50226] It is appreciated that VGAM3590 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3590 host target genes. The mRNA of each one of this plurality of VGAM3590 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3590 RNA, herein designated VGAM RNA, and which when bound by VGAM3590 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3590 host target proteins.

[50227] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3590 gene, herein designated VGAM GENE, on one or more VGAM3590 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50228] It is yet further appreciated that a function of VGAM3590 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3590 include diagnosis, prevention and treatment of viral infection by Potato virus Y. Specific functions, and accordingly utilities, of VGAM3590 correlate with, and may be deduced from, the identity of the host target genes which VGAM3590 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50229] Nucleotide sequences of the VGAM3590 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3590 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3590 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3590 are further described hereinbelow with reference to Table 1.

[50230] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3590 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50231] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3591 (VGAM3591) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50232] VGAM3591 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3591 was detected is described hereinabove with reference to Figs. 2-8.

[50233] VGAM3591 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3591 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[50234] VGAM3591 gene, herein designated VGAM GENE, encodes a VGAM3591 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3591 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3591 precursor RNA is designated SEQ ID:81252, and is provided hereinbelow with reference to the sequence listing part.

[50235] VGAM3591 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3591 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50236] An enzyme complex designated DICER COMPLEX, dices the VGAM3591 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3591 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3591 RNA is designated SEQ ID:81253, and is provided hereinbelow with reference to the sequence listing part.

[50237] VGAM3591 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3591 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3591 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50238] VGAM3591 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3591 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3591 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3591 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3591 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50239] The complementary binding of VGAM3591 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3591 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3591 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3591 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50240] It is appreciated that VGAM3591 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3591 host target genes. The mRNA of each one of this plurality of VGAM3591 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3591 RNA, herein designated VGAM RNA, and which when bound by VGAM3591 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3591 host target proteins.

[50241] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3591 gene, herein designated VGAM GENE, on one or more VGAM3591 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50242] It is yet further appreciated that a function of VGAM3591 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3591 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3591 correlate with, and may be deduced from, the identity of the host target genes which VGAM3591 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50243] Nucleotide sequences of the VGAM3591 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3591 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3591 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3591 are further

described hereinbelow with reference to Table 1.

[50244] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3591 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50245] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3592 (VGAM3592) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50246] VGAM3592 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3592 was detected is described hereinabove with reference to Figs. 2-8.

[50247] VGAM3592 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Acute bee paralysis virus. VGAM3592 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50248] VGAM3592 gene, herein designated VGAM GENE, encodes a VGAM3592 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3592 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3592 precursor RNA is designated SEQ ID:81255, and is provided hereinbelow with reference to the sequence listing part.

[50249] VGAM3592 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3592 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50250] An enzyme complex designated DICER COMPLEX, dices the VGAM3592 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3592 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3592 RNA is designated SEQ ID:81256, and is provided hereinbelow with reference to the sequence listing part.

[50251] VGAM3592 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3592 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3592 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50252] VGAM3592 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3592 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3592 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3592 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3592 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50253] The complementary binding of VGAM3592 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3592 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3592 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3592 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50254] It is appreciated that VGAM3592 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3592 host target genes. The mRNA of each one of this plurality of VGAM3592 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3592 RNA, herein designated VGAM RNA, and which when bound by VGAM3592 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3592 host target proteins.

[50255] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3592 gene, herein designated VGAM GENE, on one or more VGAM3592 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50256] It is yet further appreciated that a function of VGAM3592 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3592 include diagnosis, prevention and treatment of viral infection by Acute bee paralysis virus. Specific functions, and accordingly utilities, of VGAM3592 correlate with, and may be deduced from, the identity of the host target genes which VGAM3592 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50257] Nucleotide sequences of the VGAM3592 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3592 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3592 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3592 are further described hereinbelow with reference to Table 1.

[50258] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3592 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50259] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3593 (VGAM3593) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50260] VGAM3593 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3593 was detected is described hereinabove with reference to Figs. 2-8.

[50261] VGAM3593 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2. VGAM3593 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50262] VGAM3593 gene, herein designated VGAM GENE, encodes

a VGAM3593 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3593 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3593 precursor RNA is designated SEQ ID:81293, and is provided hereinbelow with reference to the sequence listing part.

[50263] VGAM3593 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3593 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50264] An enzyme complex designated DICER COMPLEX, dices the VGAM3593 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3593 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3593 RNA is designated SEQ ID:81294, and is provided hereinbelow with reference to the sequence listing part.

[50265] VGAM3593 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3593 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3593 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50266] VGAM3593 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3593 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3593 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3593 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3593 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50267] The complementary binding of VGAM3593 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3593 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3593 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3593 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[50268] It is appreciated that VGAM3593 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3593 host target genes. The mRNA of each one of this plurality of VGAM3593 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3593 RNA, herein designated VGAM RNA, and which when bound by VGAM3593 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3593 host target proteins.

[50269] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3593 gene, herein designated VGAM GENE, on one or more VGAM3593 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50270] It is yet further appreciated that a function of VGAM3593 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3593 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3593 correlate with, and may be deduced from, the identity of the host target genes which VGAM3593 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50271] Nucleotide sequences of the VGAM3593 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3593 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3593 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3593 are further described hereinbelow with reference to Table 1.

[50272] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3593 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50273] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3594 (VGAM3594) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50274] VGAM3594 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3594 was detected is described hereinabove with reference to Figs. 2-8.

[50275] VGAM3594 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus. VGAM3594 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50276] VGAM3594 gene, herein designated VGAM GENE, encodes a VGAM3594 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3594 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3594 precursor RNA is designated SEQ ID:81305, and is provided hereinbelow with reference to the sequence listing part.

[50277] VGAM3594 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3594 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50278] An enzyme complex designated DICER COMPLEX, dices the VGAM3594 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3594 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3594 RNA is designated SEQ ID:81306, and is provided hereinbelow with reference to the sequence listing part.

[50279] VGAM3594 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3594 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3594 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50280] VGAM3594 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3594 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3594 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3594 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3594 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50281] The complementary binding of VGAM3594 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3594 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3594 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3594 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50282] It is appreciated that VGAM3594 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3594 host target genes. The mRNA of each one of this plurality of VGAM3594 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3594 RNA, herein designated VGAM RNA, and which when bound by VGAM3594 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3594 host target proteins.

[50283] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3594 gene, herein designated VGAM GENE, on one or more VGAM3594 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50284] It is yet further appreciated that a function of VGAM3594 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3594 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3594 correlate with, and may be deduced from, the identity of the host target genes which VGAM3594 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50285] Nucleotide sequences of the VGAM3594 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3594 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3594 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3594 are further described hereinbelow with reference to Table 1.

[50286] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3594 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50287] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3595 (VGAM3595) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50288] VGAM3595 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3595 was detected is described hereinabove with reference to Figs. 2-8.

[50289] VGAM3595 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3595 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50290] VGAM3595 gene, herein designated VGAM GENE, encodes a VGAM3595 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3595 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3595 precursor RNA is designated SEQ ID:81354, and is provided hereinbelow with reference to the sequence listing part.

[50291] VGAM3595 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3595 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50292] An enzyme complex designated DICER COMPLEX, dices the VGAM3595 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3595 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3595 RNA is designated SEQ ID:81355, and is provided hereinbelow with reference to the sequence listing part.

[50293] VGAM3595 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3595 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3595 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50294] VGAM3595 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3595 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3595 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3595 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3595 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50295] The complementary binding of VGAM3595 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3595 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3595 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3595 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50296] It is appreciated that VGAM3595 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3595 host target genes. The mRNA of each one of this plurality of VGAM3595 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3595 RNA, herein designated VGAM RNA, and which when bound by VGAM3595 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3595 host target proteins.

[50297] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3595 gene, herein designated VGAM GENE, on one or more VGAM3595 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50298] It is yet further appreciated that a function of VGAM3595 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3595 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3595 correlate with, and may be deduced from, the identity of the host target genes which VGAM3595 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50299] Nucleotide sequences of the VGAM3595 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3595 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3595 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3595 are further described hereinbelow with reference to Table 1.

[50300] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3595 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50301] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3596 (VGAM3596) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50302] VGAM3596 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3596 was detected is described hereinabove with reference to Figs. 2–8.

[50303] VGAM3596 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3596 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50304] VGAM3596 gene, herein designated VGAM GENE, encodes a VGAM3596 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3596 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3596 precursor RNA is designated SEQ ID:81361, and is provided hereinbelow with reference to the sequence listing part.

[50305] VGAM3596 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3596 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50306] An enzyme complex designated DICER COMPLEX, dices the VGAM3596 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3596 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3596 RNA is designated SEQ ID:81362, and is provided hereinbelow with reference to the sequence listing part.

[50307] VGAM3596 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3596 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3596 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50308] VGAM3596 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3596 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3596 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3596 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3596 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50309] The complementary binding of VGAM3596 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3596 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3596 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3596 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50310] It is appreciated that VGAM3596 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3596 host target genes. The mRNA of each one of this plurality of VGAM3596 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3596 RNA, herein designated VGAM RNA, and which when bound by VGAM3596 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3596 host target proteins.

[50311] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3596 gene, herein designated VGAM GENE, on one or more VGAM3596 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[50312] It is yet further appreciated that a function of VGAM3596 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3596 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3596 correlate with, and may be deduced from, the identity of the host target genes which VGAM3596 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50313] Nucleotide sequences of the VGAM3596 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3596 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3596 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3596 are further described hereinbelow with reference to Table 1.

[50314] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3596 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50315] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3597 (VGAM3597) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50316] VGAM3597 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3597 was detected is described hereinabove with reference to Figs. 2-8.

[50317] VGAM3597 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus. VGAM3597 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50318] VGAM3597 gene, herein designated VGAM GENE, encodes a VGAM3597 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3597 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3597 precursor RNA is designated SEQ ID:81365, and is provided hereinbelow with reference to the sequence listing part.

[50319] VGAM3597 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3597 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50320] An enzyme complex designated DICER COMPLEX, dices the VGAM3597 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3597 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3597 RNA is designated SEQ ID:81366, and is provided hereinbelow with reference to the sequence listing part.

[50321] VGAM3597 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3597 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3597 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50322] VGAM3597 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3597 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3597 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3597 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3597 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50323] The complementary binding of VGAM3597 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3597 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3597 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3597 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50324] It is appreciated that VGAM3597 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3597 host target genes. The mRNA of

each one of this plurality of VGAM3597 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3597 RNA, herein designated VGAM RNA, and which when bound by VGAM3597 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3597 host target proteins.

[50325] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3597 gene, herein designated VGAM GENE, on one or more VGAM3597 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[50326] It is yet further appreciated that a function of VGAM3597 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3597 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3597 correlate with, and may be deduced from, the identity of the host target genes which VGAM3597 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50327] Nucleotide sequences of the VGAM3597 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3597 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3597 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3597 are further described hereinbelow with reference to Table 1.

[50328] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3597 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[50329] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3598 (VGAM3598) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50330] VGAM3598 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3598 was detected is described hereinabove with reference to Figs. 2–8.

[50331] VGAM3598 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 2. VGAM3598 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50332] VGAM3598 gene, herein designated VGAM GENE, encodes a VGAM3598 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3598 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3598 precursor RNA is designated SEQ ID:81371, and is provided hereinbelow with reference to the sequence listing part.

[50333] VGAM3598 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3598 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50334] An enzyme complex designated DICER COMPLEX, dices the VGAM3598 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3598 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3598 RNA is designated SEQ ID:81372,

and is provided hereinbelow with reference to the sequence listing part.

[50335] VGAM3598 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3598 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3598 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50336] VGAM3598 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3598 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3598 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3598 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3598 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50337] The complementary binding of VGAM3598 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3598 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3598 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3598 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50338] It is appreciated that VGAM3598 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3598 host target genes. The mRNA of each one of this plurality of VGAM3598 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3598 RNA, herein designated VGAM RNA, and which when bound by VGAM3598 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3598 host target proteins.

[50339] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3598 gene, herein designated VGAM GENE, on one or more VGAM3598 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50340] It is yet further appreciated that a function of VGAM3598 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3598 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3598 correlate with, and may be deduced from, the identity of the host target genes which VGAM3598 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50341] Nucleotide sequences of the VGAM3598 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3598 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3598 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3598 are further described hereinbelow with reference to Table 1.

[50342] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3598 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50343] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3599 (VGAM3599) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50344] VGAM3599 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3599 was detected is described hereinabove with reference to Figs. 2–8.

[50345] VGAM3599 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cymbidium mosaic virus. VGAM3599 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50346] VGAM3599 gene, herein designated VGAM GENE, encodes a VGAM3599 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3599 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3599 precursor

sor RNA is designated SEQ ID:81380, and is provided hereinbelow with reference to the sequence listing part.

[50347] VGAM3599 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3599 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50348] An enzyme complex designated DICER COMPLEX, dices the VGAM3599 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3599 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3599 RNA is designated SEQ ID:81381, and is provided hereinbelow with reference to the se-

quence listing part.

[50349] VGAM3599 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3599 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3599 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50350] VGAM3599 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3599 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3599 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3599 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3599 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50351] The complementary binding of VGAM3599 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3599 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3599 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3599 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50352] It is appreciated that VGAM3599 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3599 host target genes. The mRNA of each one of this plurality of VGAM3599 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3599 RNA, herein designated VGAM RNA, and which when bound by VGAM3599 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3599 host target proteins.

[50353] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3599 gene, herein designated VGAM GENE, on one or more VGAM3599 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50354] It is yet further appreciated that a function of VGAM3599

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3599 include diagnosis, prevention and treatment of viral infection by Cymbidium mosaic virus. Specific functions, and accordingly utilities, of VGAM3599 correlate with, and may be deduced from, the identity of the host target genes which VGAM3599 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50355] Nucleotide sequences of the VGAM3599 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3599 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3599 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3599 are further described hereinbelow with reference to Table 1.

[50356] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3599 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50357] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3600 (VGAM3600) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50358] VGAM3600 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3600 was detected is described hereinabove with reference to Figs. 2–8.

[50359] VGAM3600 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3600 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50360] VGAM3600 gene, herein designated VGAM GENE, encodes a VGAM3600 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3600 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3600 precursor RNA is designated SEQ ID:81426, and is provided

hereinbelow with reference to the sequence listing part.

[50361] VGAM3600 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3600 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50362] An enzyme complex designated DICER COMPLEX, dices the VGAM3600 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3600 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3600 RNA is designated SEQ ID:81427, and is provided hereinbelow with reference to the sequence listing part.

[50363] VGAM3600 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3600 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3600 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50364] VGAM3600 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3600 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3600 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3600 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3600 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50365] The complementary binding of VGAM3600 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3600 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3600 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3600 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50366] It is appreciated that VGAM3600 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3600 host target genes. The mRNA of each one of this plurality of VGAM3600 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3600 RNA, herein designated VGAM RNA, and which when bound by VGAM3600 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3600 host target proteins.

[50367] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3600 gene, herein designated VGAM GENE, on one or more VGAM3600 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50368] It is yet further appreciated that a function of VGAM3600 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3600 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3600 correlate with, and may be deduced from, the identity of the host target genes which VGAM3600 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50369] Nucleotide sequences of the VGAM3600 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3600 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3600 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3600 are further described hereinbelow with reference to Table 1.

[50370] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3600 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50371] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3601 (VGAM3601) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50372] VGAM3601 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3601 was detected is described hereinabove with reference to Figs. 2–8.

[50373] VGAM3601 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ateline herpesvirus 3. VGAM3601 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50374] VGAM3601 gene, herein designated VGAM GENE, encodes a VGAM3601 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3601 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3601 precursor RNA is designated SEQ ID:81435, and is provided hereinbelow with reference to the sequence listing part.

[50375] VGAM3601 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3601 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50376] An enzyme complex designated DICER COMPLEX, dices the VGAM3601 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3601 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3601 RNA is designated SEQ ID:81436, and is provided hereinbelow with reference to the sequence listing part.

[50377] VGAM3601 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3601 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3601 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50378] VGAM3601 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3601 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3601 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3601 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3601 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50379] The complementary binding of VGAM3601 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3601 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3601 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3601 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50380] It is appreciated that VGAM3601 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3601 host target genes. The mRNA of each one of this plurality of VGAM3601 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3601 RNA, herein designated VGAM

RNA, and which when bound by VGAM3601 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3601 host target proteins.

[50381] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3601 gene, herein designated VGAM GENE, on one or more VGAM3601 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50382] It is yet further appreciated that a function of VGAM3601 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3601 include diagnosis, prevention and treatment of viral infection by Ateline herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3601 correlate with, and may be deduced from, the identity of the host target genes which VGAM3601 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50383] Nucleotide sequences of the VGAM3601 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3601 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3601 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3601 are further described hereinbelow with reference to Table 1.

[50384] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3601 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50385] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3602 (VGAM3602) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50386] VGAM3602 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3602 was detected is described hereinabove with reference to Figs. 2-8.

[50387] VGAM3602 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3602 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50388] VGAM3602 gene, herein designated VGAM GENE, encodes a VGAM3602 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3602 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3602 precursor RNA is designated SEQ ID:81455, and is provided hereinbelow with reference to the sequence listing part.

[50389] VGAM3602 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3602 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50390] An enzyme complex designated DICER COMPLEX, dices the VGAM3602 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3602 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3602 RNA is designated SEQ ID:81456, and is provided hereinbelow with reference to the sequence listing part.

[50391] VGAM3602 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3602 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3602 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50392] VGAM3602 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3602 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3602 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3602 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3602 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50393] The complementary binding of VGAM3602 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3602 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3602 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3602 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50394] It is appreciated that VGAM3602 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3602 host target genes. The mRNA of each one of this plurality of VGAM3602 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3602 RNA, herein designated VGAM RNA, and which when bound by VGAM3602 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3602 host target proteins.

[50395] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3602 gene, herein designated VGAM GENE, on one or more VGAM3602 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50396] It is yet further appreciated that a function of VGAM3602 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3602 include diagnosis, prevention and

treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3602 correlate with, and may be deduced from, the identity of the host target genes which VGAM3602 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50397] Nucleotide sequences of the VGAM3602 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3602 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3602 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3602 are further described hereinbelow with reference to Table 1.

[50398] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3602 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50399] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3603 (VGAM3603) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50400] VGAM3603 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3603 was detected is described hereinabove with reference to Figs. 2–8.

[50401] VGAM3603 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3603 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50402] VGAM3603 gene, herein designated VGAM GENE, encodes a VGAM3603 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3603 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3603 precursor RNA is designated SEQ ID:81537, and is provided hereinbelow with reference to the sequence listing part.

[50403] VGAM3603 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3603 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50404] An enzyme complex designated DICER COMPLEX, dices the VGAM3603 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3603 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3603 RNA is designated SEQ ID:81538, and is provided hereinbelow with reference to the sequence listing part.

[50405] VGAM3603 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3603 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3603 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50406] VGAM3603 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3603 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3603 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3603 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3603 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50407] The complementary binding of VGAM3603 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3603 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3603 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3603 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50408] It is appreciated that VGAM3603 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3603 host target genes. The mRNA of each one of this plurality of VGAM3603 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3603 RNA, herein designated VGAM RNA, and which when bound by VGAM3603 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3603 host target proteins.

[50409] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3603 gene, herein designated VGAM GENE, on one or more VGAM3603 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50410] It is yet further appreciated that a function of VGAM3603 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3603 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific

functions, and accordingly utilities, of VGAM3603 correlate with, and may be deduced from, the identity of the host target genes which VGAM3603 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50411] Nucleotide sequences of the VGAM3603 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3603 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3603 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3603 are further described hereinbelow with reference to Table 1.

[50412] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3603 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50413] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3604 (VGAM3604) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[50414] VGAM3604 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3604 was detected is described hereinabove with reference to Figs. 2–8.

[50415] VGAM3604 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3604 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50416] VGAM3604 gene, herein designated VGAM GENE, encodes a VGAM3604 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3604 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3604 precursor RNA is designated SEQ ID:81540, and is provided hereinbelow with reference to the sequence listing part.

[50417] VGAM3604 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3604 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50418] An enzyme complex designated DICER COMPLEX, dices the VGAM3604 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3604 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3604 RNA is designated SEQ ID:81541, and is provided hereinbelow with reference to the sequence listing part.

[50419] VGAM3604 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3604 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3604 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50420] VGAM3604 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3604 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3604 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3604 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3604 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50421] The complementary binding of VGAM3604 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3604 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3604 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3604 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50422] It is appreciated that VGAM3604 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3604 host target genes. The mRNA of each one of this plurality of VGAM3604 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3604 RNA, herein designated VGAM RNA, and which when bound by VGAM3604 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3604 host target proteins.

[50423] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3604 gene, herein designated VGAM GENE, on one or more VGAM3604 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50424] It is yet further appreciated that a function of VGAM3604 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3604 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utili-

ties, of VGAM3604 correlate with, and may be deduced from, the identity of the host target genes which VGAM3604 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50425] Nucleotide sequences of the VGAM3604 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3604 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3604 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3604 are further described hereinbelow with reference to Table 1.

[50426] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3604 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50427] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3605 (VGAM3605) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[50428] VGAM3605 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3605 was detected is described hereinabove with reference to Figs. 2–8.

[50429] VGAM3605 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 1. VGAM3605 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50430] VGAM3605 gene, herein designated VGAM GENE, encodes a VGAM3605 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3605 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3605 precursor RNA is designated SEQ ID:81567, and is provided hereinbelow with reference to the sequence listing part.

[50431] VGAM3605 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3605 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50432] An enzyme complex designated DICER COMPLEX, dices the VGAM3605 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3605 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3605 RNA is designated SEQ ID:81568, and is provided hereinbelow with reference to the sequence listing part.

[50433] VGAM3605 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3605 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3605 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50434] VGAM3605 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3605 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3605 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3605 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3605 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50435] The complementary binding of VGAM3605 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3605 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3605 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3605 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50436] It is appreciated that VGAM3605 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3605 host target genes. The mRNA of each one of this plurality of VGAM3605 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3605 RNA, herein designated VGAM RNA, and which when bound by VGAM3605 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3605 host target proteins.

[50437] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3605 gene, herein designated VGAM GENE, on one or more VGAM3605 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50438] It is yet further appreciated that a function of VGAM3605 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3605 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3605 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3605 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50439] Nucleotide sequences of the VGAM3605 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3605 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3605 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3605 are further described hereinbelow with reference to Table 1.

[50440] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3605 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50441] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3606 (VGAM3606) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50442] VGAM3606 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3606 was detected is described hereinabove with reference to Figs. 2–8.

[50443] VGAM3606 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 3. VGAM3606 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50444] VGAM3606 gene, herein designated VGAM GENE, encodes a VGAM3606 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3606 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3606 precursor RNA is designated SEQ ID:81590, and is provided hereinbelow with reference to the sequence listing part.

[50445] VGAM3606 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3606 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50446] An enzyme complex designated DICER COMPLEX, dices the VGAM3606 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3606 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3606 RNA is designated SEQ ID:81591, and is provided hereinbelow with reference to the sequence listing part.

[50447] VGAM3606 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3606 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3606 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50448] VGAM3606 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3606 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3606 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3606 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3606 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50449] The complementary binding of VGAM3606 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3606 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3606 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3606 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50450] It is appreciated that VGAM3606 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3606 host target genes. The mRNA of each one of this plurality of VGAM3606 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3606 RNA, herein designated VGAM RNA, and which when bound by VGAM3606 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3606 host target proteins.

[50451] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3606 gene, herein designated VGAM GENE, on one or more VGAM3606 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50452] It is yet further appreciated that a function of VGAM3606 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3606 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3606 correlate with, and may be deduced from, the identity of the host target genes which VGAM3606 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[50453] Nucleotide sequences of the VGAM3606 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3606 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3606 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3606 are further described hereinbelow with reference to Table 1.

[50454] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3606 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50455] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3607 (VGAM3607) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50456] VGAM3607 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3607 was detected is described hereinabove with reference to Figs. 2–8.

[50457] VGAM3607 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Himetobi P virus.

VGAM3607 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50458] VGAM3607 gene, herein designated VGAM GENE, encodes a VGAM3607 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3607 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3607 precursor RNA is designated SEQ ID:81595, and is provided hereinbelow with reference to the sequence listing part.

[50459] VGAM3607 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3607 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50460] An enzyme complex designated DICER COMPLEX, dices the VGAM3607 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3607 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3607 RNA is designated SEQ ID:81596, and is provided hereinbelow with reference to the sequence listing part.

[50461] VGAM3607 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3607 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3607 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50462] VGAM3607 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3607 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3607 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3607 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3607 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[50463] The complementary binding of VGAM3607 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3607 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3607 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3607 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50464] It is appreciated that VGAM3607 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3607 host target genes. The mRNA of each one of this plurality of VGAM3607 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3607 RNA, herein designated VGAM RNA, and which when bound by VGAM3607 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3607 host target proteins.

[50465] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3607 gene, herein designated VGAM GENE, on one or more VGAM3607 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50466] It is yet further appreciated that a function of VGAM3607 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3607 include diagnosis, prevention and treatment of viral infection by Himetobi P virus. Specific functions, and accordingly utilities, of VGAM3607 correlate with, and may be deduced from, the identity of the host target genes which VGAM3607 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[50467] Nucleotide sequences of the VGAM3607 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3607 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3607 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3607 are further described hereinbelow with reference to Table 1.

[50468] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3607 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50469] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3608 (VGAM3608) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50470] VGAM3608 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3608 was detected is described hereinabove with reference to Figs. 2–8.

[50471] VGAM3608 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3608 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50472] VGAM3608 gene, herein designated VGAM GENE, encodes a VGAM3608 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3608 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3608 precursor RNA is designated SEQ ID:81602, and is provided hereinbelow with reference to the sequence listing part.

[50473] VGAM3608 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3608 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50474] An enzyme complex designated DICER COMPLEX, dices the VGAM3608 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3608 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3608 RNA is designated SEQ ID:81603, and is provided hereinbelow with reference to the sequence listing part.

[50475] VGAM3608 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3608 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3608 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[50476] VGAM3608 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3608 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3608 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3608 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3608 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50477] The complementary binding of VGAM3608 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3608 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3608 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3608 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50478] It is appreciated that VGAM3608 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3608 host target genes. The mRNA of each one of this plurality of VGAM3608 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3608 RNA, herein designated VGAM RNA, and which when bound by VGAM3608 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3608 host target proteins.

[50479] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3608 gene, herein designated VGAM GENE, on one

or more VGAM3608 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50480] It is yet further appreciated that a function of VGAM3608 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3608 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3608 correlate with, and may be deduced from, the identity of the host target genes which VGAM3608 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50481] Nucleotide sequences of the VGAM3608 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3608 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3608 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3608 are further described hereinbelow with reference to Table 1.

[50482] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3608 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50483] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3609 (VGAM3609) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50484] VGAM3609 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3609 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[50485] VGAM3609 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Monkeypox virus.

VGAM3609 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50486] VGAM3609 gene, herein designated VGAM GENE, encodes a VGAM3609 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3609 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3609 precursor RNA is designated SEQ ID:81610, and is provided hereinbelow with reference to the sequence listing part.

[50487] VGAM3609 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3609 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50488] An enzyme complex designated DICER COMPLEX, dices the VGAM3609 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3609 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3609 RNA is designated SEQ ID:81611, and is provided hereinbelow with reference to the sequence listing part.

[50489] VGAM3609 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3609 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3609 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50490] VGAM3609 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3609 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3609 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3609 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3609 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50491] The complementary binding of VGAM3609 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3609 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3609 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3609 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50492] It is appreciated that VGAM3609 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3609 host target genes. The mRNA of each one of this plurality of VGAM3609 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3609 RNA, herein designated VGAM RNA, and which when bound by VGAM3609 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3609 host target proteins.

[50493] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3609 gene, herein designated VGAM GENE, on one or more VGAM3609 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50494] It is yet further appreciated that a function of VGAM3609 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3609 include diagnosis, prevention and treatment of viral infection by Monkeypox virus. Specific functions, and accordingly utilities, of VGAM3609 correlate with, and may be deduced from, the identity of the host target genes which VGAM3609 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50495] Nucleotide sequences of the VGAM3609 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3609 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3609 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3609 are further described hereinbelow with reference to Table 1.

[50496] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3609 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50497] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3610 (VGAM3610) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50498] VGAM3610 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3610 was detected is described hereinabove with reference to Figs. 2-8.

[50499] VGAM3610 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Variola virus. VGAM3610 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50500] VGAM3610 gene, herein designated VGAM GENE, encodes a VGAM3610 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3610 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3610 precursor RNA is designated SEQ ID:81623, and is provided hereinbelow with reference to the sequence listing part.

[50501] VGAM3610 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3610 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50502] An enzyme complex designated DICER COMPLEX, dices the VGAM3610 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3610 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3610 RNA is designated SEQ ID:81624, and is provided hereinbelow with reference to the sequence listing part.

[50503] VGAM3610 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3610 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3610 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50504] VGAM3610 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3610 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3610 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3610 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3610 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50505] The complementary binding of VGAM3610 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3610 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3610 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3610 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50506] It is appreciated that VGAM3610 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3610 host target genes. The mRNA of each one of this plurality of VGAM3610 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3610 RNA, herein designated VGAM RNA, and which when bound by VGAM3610 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3610 host target proteins.

[50507] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3610 gene, herein designated VGAM GENE, on one or more VGAM3610 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50508] It is yet further appreciated that a function of VGAM3610 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3610 include diagnosis, prevention and treatment of viral infection by Variola virus. Specific functions, and accordingly utilities, of VGAM3610 correlate with, and may be deduced from, the identity of the host target genes which VGAM3610 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50509] Nucleotide sequences of the VGAM3610 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3610 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3610 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3610 are further described hereinbelow with reference to Table 1.

[50510] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3610 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50511] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3611 (VGAM3611) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50512] VGAM3611 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3611 was detected is described hereinabove with reference to Figs. 2-8.

[50513] VGAM3611 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3611 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50514] VGAM3611 gene, herein designated VGAM GENE, encodes a VGAM3611 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3611 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3611 precursor RNA is designated SEQ ID:81626, and is provided hereinbelow with reference to the sequence listing part.

[50515] VGAM3611 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3611 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50516] An enzyme complex designated DICER COMPLEX, dices

the VGAM3611 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3611 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3611 RNA is designated SEQ ID:81627, and is provided hereinbelow with reference to the sequence listing part.

[50517] VGAM3611 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3611 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3611 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50518] VGAM3611 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3611 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3611 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3611 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3611 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50519] The complementary binding of VGAM3611 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3611 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3611 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3611 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50520] It is appreciated that VGAM3611 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3611 host target genes. The mRNA of each one of this plurality of VGAM3611 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3611 RNA, herein designated VGAM RNA, and which when bound by VGAM3611 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3611 host target proteins.

[50521] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3611 gene, herein designated VGAM GENE, on one or more VGAM3611 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50522] It is yet further appreciated that a function of VGAM3611 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3611 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3611 correlate with, and may be deduced from, the identity of the host target genes which VGAM3611 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50523] Nucleotide sequences of the VGAM3611 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3611 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3611 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3611 are further described hereinbelow with reference to Table 1.

[50524] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3611 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50525] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3612 (VGAM3612) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50526] VGAM3612 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3612 was detected is described hereinabove with reference to Figs. 2-8.

[50527] VGAM3612 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2. VGAM3612 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[50528] VGAM3612 gene, herein designated VGAM GENE, encodes a VGAM3612 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3612 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3612 precursor RNA is designated SEQ ID:81632, and is provided hereinbelow with reference to the sequence listing part.

[50529] VGAM3612 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3612 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50530] An enzyme complex designated DICER COMPLEX, dices the VGAM3612 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3612 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3612 RNA is designated SEQ ID:81633, and is provided hereinbelow with reference to the sequence listing part.

[50531] VGAM3612 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3612 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3612 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50532] VGAM3612 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3612 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3612 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3612 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3612 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50533] The complementary binding of VGAM3612 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3612 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3612

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3612 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50534] It is appreciated that VGAM3612 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3612 host target genes. The mRNA of each one of this plurality of VGAM3612 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3612 RNA, herein designated VGAM RNA, and which when bound by VGAM3612 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3612 host target proteins.

[50535] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3612 gene, herein designated VGAM GENE, on one or more VGAM3612 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50536] It is yet further appreciated that a function of VGAM3612 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3612 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3612 correlate with, and may be deduced from, the identity of the host target genes which VGAM3612 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50537] Nucleotide sequences of the VGAM3612 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3612 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3612 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3612 are further described hereinbelow with reference to Table 1.

[50538] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3612 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50539] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3613 (VGAM3613) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50540] VGAM3613 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3613 was detected is described hereinabove with reference to Figs. 2-8.

[50541] VGAM3613 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1. VGAM3613 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[50542] VGAM3613 gene, herein designated VGAM GENE, encodes a VGAM3613 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3613 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3613 precursor RNA is designated SEQ ID:81702, and is provided hereinbelow with reference to the sequence listing part.

[50543] VGAM3613 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3613 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50544] An enzyme complex designated DICER COMPLEX, dices the VGAM3613 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3613 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3613 RNA is designated SEQ ID:81703, and is provided hereinbelow with reference to the sequence listing part.

[50545] VGAM3613 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3613 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3613 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50546] VGAM3613 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3613 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3613 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3613 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3613 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50547] The complementary binding of VGAM3613 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3613 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3613 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3613 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50548] It is appreciated that VGAM3613 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3613 host target genes. The mRNA of each one of this plurality of VGAM3613 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3613 RNA, herein designated VGAM RNA, and which when bound by VGAM3613 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3613 host target proteins.

[50549] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3613 gene, herein designated VGAM GENE, on one or more VGAM3613 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50550] It is yet further appreciated that a function of VGAM3613 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3613 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3613 correlate with, and may be deduced from, the identity of the host target genes which VGAM3613 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50551] Nucleotide sequences of the VGAM3613 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3613 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3613 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3613 are further

described hereinbelow with reference to Table 1.

[50552] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3613 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50553] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3614 (VGAM3614) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50554] VGAM3614 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3614 was detected is described hereinabove with reference to Figs. 2-8.

[50555] VGAM3614 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpea mottle virus. VGAM3614 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50556] VGAM3614 gene, herein designated VGAM GENE, encodes a VGAM3614 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3614 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3614 precursor RNA is designated SEQ ID:81724, and is provided hereinbelow with reference to the sequence listing part.

[50557] VGAM3614 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3614 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50558] An enzyme complex designated DICER COMPLEX, dices the VGAM3614 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3614 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3614 RNA is designated SEQ ID:81725, and is provided hereinbelow with reference to the sequence listing part.

[50559] VGAM3614 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3614 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3614 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50560] VGAM3614 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3614 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3614 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3614 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3614 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50561] The complementary binding of VGAM3614 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3614 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3614 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3614 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50562] It is appreciated that VGAM3614 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3614 host target genes. The mRNA of each one of this plurality of VGAM3614 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3614 RNA, herein designated VGAM RNA, and which when bound by VGAM3614 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3614 host target proteins.

[50563] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3614 gene, herein designated VGAM GENE, on one or more VGAM3614 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50564] It is yet further appreciated that a function of VGAM3614 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3614 include diagnosis, prevention and treatment of viral infection by Cowpea mottle virus. Specific functions, and accordingly utilities, of VGAM3614 correlate with, and may be deduced from, the identity of the host target genes which VGAM3614 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50565] Nucleotide sequences of the VGAM3614 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3614 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3614 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3614 are further described hereinbelow with reference to Table 1.

[50566] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3614 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50567]

[50568] Fig. 1 further provides a conceptual description of a novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3615 (VGAM3615) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50569] VGAM3615 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3615 was detected is described hereinabove with reference to Figs. 2-8.

[50570] VGAM3615 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3615 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50571] VGAM3615 gene, herein designated VGAM GENE, encodes

a VGAM3615 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3615 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3615 precursor RNA is designated SEQ ID:81739, and is provided hereinbelow with reference to the sequence listing part.

[50572] VGAM3615 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3615 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50573] An enzyme complex designated DICER COMPLEX, dices the VGAM3615 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3615 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3615 RNA is designated SEQ ID:81740, and is provided hereinbelow with reference to the sequence listing part.

[50574] VGAM3615 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3615 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3615 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50575] VGAM3615 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3615 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3615 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3615 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3615 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50576] The complementary binding of VGAM3615 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3615 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3615 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3615 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[50577] It is appreciated that VGAM3615 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3615 host target genes. The mRNA of each one of this plurality of VGAM3615 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3615 RNA, herein designated VGAM RNA, and which when bound by VGAM3615 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3615 host target proteins.

[50578] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3615 gene, herein designated VGAM GENE, on one or more VGAM3615 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50579] It is yet further appreciated that a function of VGAM3615 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3615 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3615 correlate with, and may be deduced from, the identity of the host target genes which VGAM3615 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50580] Nucleotide sequences of the VGAM3615 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3615 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3615 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3615 are further described hereinbelow with reference to Table 1.

[50581] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3615 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50582] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3616 (VGAM3616) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50583] VGAM3616 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3616 was detected is described hereinabove with reference to Figs. 2-8.

[50584] VGAM3616 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3616 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50585] VGAM3616 gene, herein designated VGAM GENE, encodes a VGAM3616 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3616 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3616 precursor RNA is designated SEQ ID:81747, and is provided hereinbelow with reference to the sequence listing part.

[50586] VGAM3616 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3616 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50587] An enzyme complex designated DICER COMPLEX, dices the VGAM3616 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3616 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3616 RNA is designated SEQ ID:81748, and is provided hereinbelow with reference to the sequence listing part.

[50588] VGAM3616 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3616 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3616 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50589] VGAM3616 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3616 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3616 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3616 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3616 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50590] The complementary binding of VGAM3616 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3616 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3616 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3616 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50591] It is appreciated that VGAM3616 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3616 host target genes. The mRNA of each one of this plurality of VGAM3616 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3616 RNA, herein designated VGAM RNA, and which when bound by VGAM3616 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3616 host target proteins.

[50592] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3616 gene, herein designated VGAM GENE, on one or more VGAM3616 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50593] It is yet further appreciated that a function of VGAM3616 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3616 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3616 correlate with, and may be deduced from, the identity of the host target genes which VGAM3616 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50594] Nucleotide sequences of the VGAM3616 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3616 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3616 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3616 are further described hereinbelow with reference to Table 1.

[50595] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3616 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50596] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3617 (VGAM3617) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50597] VGAM3617 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3617 was detected is described hereinabove with reference to Figs. 2-8.

[50598] VGAM3617 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Patchouli mild mosaic virus. VGAM3617 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50599] VGAM3617 gene, herein designated VGAM GENE, encodes a VGAM3617 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3617 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3617 precursor RNA is designated SEQ ID:81755, and is provided hereinbelow with reference to the sequence listing part.

[50600] VGAM3617 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3617 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50601] An enzyme complex designated DICER COMPLEX, dices the VGAM3617 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3617 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3617 RNA is designated SEQ ID:81756, and is provided hereinbelow with reference to the sequence listing part.

[50602] VGAM3617 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3617 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3617 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50603] VGAM3617 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3617 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3617 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3617 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3617 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50604] The complementary binding of VGAM3617 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3617 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3617 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3617 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50605] It is appreciated that VGAM3617 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3617 host target genes. The mRNA of each one of this plurality of VGAM3617 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3617 RNA, herein designated VGAM RNA, and which when bound by VGAM3617 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3617 host target proteins.

[50606] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3617 gene, herein designated VGAM GENE, on one or more VGAM3617 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50607] It is yet further appreciated that a function of VGAM3617 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3617 include diagnosis, prevention and treatment of viral infection by Patchouli mild mosaic virus. Specific functions, and accordingly utilities, of VGAM3617 correlate with, and may be deduced from, the identity of the host target genes which VGAM3617 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50608] Nucleotide sequences of the VGAM3617 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3617 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3617 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3617 are further described hereinbelow with reference to Table 1.

[50609] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3617 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50610] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3618 (VGAM3618) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50611] VGAM3618 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3618 was detected is described hereinabove with reference to Figs. 2–8.

[50612] VGAM3618 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3618 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50613] VGAM3618 gene, herein designated VGAM GENE, encodes a VGAM3618 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3618 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3618 precursor RNA is designated SEQ ID:81785, and is provided hereinbelow with reference to the sequence listing part.

[50614] VGAM3618 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3618 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50615] An enzyme complex designated DICER COMPLEX, dices the VGAM3618 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3618 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3618 RNA is designated SEQ ID:81786, and is provided hereinbelow with reference to the sequence listing part.

[50616] VGAM3618 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3618 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3618 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50617] VGAM3618 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3618 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3618 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3618 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3618 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50618] The complementary binding of VGAM3618 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3618 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3618 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3618 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50619] It is appreciated that VGAM3618 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3618 host target genes. The mRNA of each one of this plurality of VGAM3618 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3618 RNA, herein designated VGAM RNA, and which when bound by VGAM3618 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3618 host target proteins.

[50620] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3618 gene, herein designated VGAM GENE, on one or more VGAM3618 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [50621] It is yet further appreciated that a function of VGAM3618 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3618 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3618 correlate with, and may be deduced from, the identity of the host target genes which VGAM3618 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [50622] Nucleotide sequences of the VGAM3618 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3618 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3618 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3618 are further described hereinbelow with reference to Table 1.
- [50623] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3618 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50624] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3619 (VGAM3619) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50625] VGAM3619 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3619 was detected is described hereinabove with reference to Figs. 2–8.

[50626] VGAM3619 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3619 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50627] VGAM3619 gene, herein designated VGAM GENE, encodes a VGAM3619 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3619 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3619 precursor RNA is designated SEQ ID:81800, and is provided hereinbelow with reference to the sequence listing part.

[50628] VGAM3619 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3619 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50629] An enzyme complex designated DICER COMPLEX, dices the VGAM3619 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3619 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3619 RNA is designated SEQ ID:81801, and is provided hereinbelow with reference to the sequence listing part.

[50630] VGAM3619 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3619 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3619 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50631] VGAM3619 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3619 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3619 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3619 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3619 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50632] The complementary binding of VGAM3619 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3619 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3619 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3619 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50633] It is appreciated that VGAM3619 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3619 host target genes. The mRNA of

each one of this plurality of VGAM3619 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3619 RNA, herein designated VGAM RNA, and which when bound by VGAM3619 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3619 host target proteins.

[50634] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3619 gene, herein designated VGAM GENE, on one or more VGAM3619 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[50635] It is yet further appreciated that a function of VGAM3619 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3619 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3619 correlate with, and may be deduced from, the identity of the host target genes which VGAM3619 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50636] Nucleotide sequences of the VGAM3619 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3619 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3619 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3619 are further described hereinbelow with reference to Table 1.

[50637] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3619 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[50638] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3620 (VGAM3620) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50639] VGAM3620 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3620 was detected is described hereinabove with reference to Figs. 2–8.

[50640] VGAM3620 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3620 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50641] VGAM3620 gene, herein designated VGAM GENE, encodes a VGAM3620 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3620 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3620 precursor RNA is designated SEQ ID:81865, and is provided hereinbelow with reference to the sequence listing part.

[50642] VGAM3620 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3620 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50643] An enzyme complex designated DICER COMPLEX, dices the VGAM3620 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3620 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3620 RNA is designated SEQ ID:81866,

and is provided hereinbelow with reference to the sequence listing part.

[50644] VGAM3620 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3620 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3620 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50645] VGAM3620 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3620 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3620 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3620 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3620 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50646] The complementary binding of VGAM3620 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3620 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3620 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3620 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50647] It is appreciated that VGAM3620 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3620 host target genes. The mRNA of each one of this plurality of VGAM3620 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3620 RNA, herein designated VGAM RNA, and which when bound by VGAM3620 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3620 host target proteins.

[50648] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3620 gene, herein designated VGAM GENE, on one or more VGAM3620 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50649] It is yet further appreciated that a function of VGAM3620 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3620 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3620 correlate with, and may be deduced from, the identity of the host target genes which VGAM3620 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50650] Nucleotide sequences of the VGAM3620 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3620 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3620 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3620 are further described hereinbelow with reference to Table 1.

[50651] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3620 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50652] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3621 (VGAM3621) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50653] VGAM3621 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3621 was detected is described hereinabove with reference to Figs. 2–8.

[50654] VGAM3621 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3621 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50655] VGAM3621 gene, herein designated VGAM GENE, encodes a VGAM3621 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3621 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3621 precursor

sor RNA is designated SEQ ID:81870, and is provided hereinbelow with reference to the sequence listing part.

[50656] VGAM3621 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3621 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50657] An enzyme complex designated DICER COMPLEX, dices the VGAM3621 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3621 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3621 RNA is designated SEQ ID:81871, and is provided hereinbelow with reference to the se-

quence listing part.

[50658] VGAM3621 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3621 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3621 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50659] VGAM3621 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3621 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3621 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3621 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3621 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50660] The complementary binding of VGAM3621 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3621 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3621 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3621 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50661] It is appreciated that VGAM3621 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3621 host target genes. The mRNA of each one of this plurality of VGAM3621 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3621 RNA, herein designated VGAM RNA, and which when bound by VGAM3621 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3621 host target proteins.

[50662] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3621 gene, herein designated VGAM GENE, on one or more VGAM3621 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50663] It is yet further appreciated that a function of VGAM3621

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3621 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3621 correlate with, and may be deduced from, the identity of the host target genes which VGAM3621 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50664] Nucleotide sequences of the VGAM3621 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3621 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3621 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3621 are further described hereinbelow with reference to Table 1.

[50665] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3621 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50666] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3622 (VGAM3622) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50667] VGAM3622 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3622 was detected is described hereinabove with reference to Figs. 2–8.

[50668] VGAM3622 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Horseradish curly top virus. VGAM3622 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50669] VGAM3622 gene, herein designated VGAM GENE, encodes a VGAM3622 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3622 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3622 precursor RNA is designated SEQ ID:81951, and is provided

hereinbelow with reference to the sequence listing part.

[50670] VGAM3622 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3622 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50671] An enzyme complex designated DICER COMPLEX, dices the VGAM3622 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3622 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3622 RNA is designated SEQ ID:81952, and is provided hereinbelow with reference to the sequence listing part.

[50672] VGAM3622 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3622 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3622 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50673] VGAM3622 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3622 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3622 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3622 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3622 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50674] The complementary binding of VGAM3622 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3622 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3622 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3622 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50675] It is appreciated that VGAM3622 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3622 host target genes. The mRNA of each one of this plurality of VGAM3622 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3622 RNA, herein designated VGAM RNA, and which when bound by VGAM3622 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3622 host target proteins.

[50676] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3622 gene, herein designated VGAM GENE, on one or more VGAM3622 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50677] It is yet further appreciated that a function of VGAM3622 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3622 include diagnosis, prevention and treatment of viral infection by Horseradish curly top virus. Specific functions, and accordingly utilities, of VGAM3622 correlate with, and may be deduced from, the identity of the host target genes which VGAM3622 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50678] Nucleotide sequences of the VGAM3622 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3622 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3622 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3622 are further described hereinbelow with reference to Table 1.

[50679] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3622 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50680] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3623 (VGAM3623) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50681] VGAM3623 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3623 was detected is described hereinabove with reference to Figs. 2–8.

[50682] VGAM3623 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious hematopoietic necrosis virus. VGAM3623 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50683] VGAM3623 gene, herein designated VGAM GENE, encodes a VGAM3623 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3623 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3623 precursor RNA is designated SEQ ID:81964, and is provided hereinbelow with reference to the sequence listing part.

[50684] VGAM3623 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3623 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50685] An enzyme complex designated DICER COMPLEX, dices the VGAM3623 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3623 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3623 RNA is designated SEQ ID:81965, and is provided hereinbelow with reference to the sequence listing part.

[50686] VGAM3623 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3623 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3623 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50687] VGAM3623 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3623 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3623 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3623 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3623 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50688] The complementary binding of VGAM3623 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3623 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3623 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3623 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50689] It is appreciated that VGAM3623 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3623 host target genes. The mRNA of each one of this plurality of VGAM3623 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3623 RNA, herein designated VGAM

RNA, and which when bound by VGAM3623 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3623 host target proteins.

[50690] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3623 gene, herein designated VGAM GENE, on one or more VGAM3623 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50691] It is yet further appreciated that a function of VGAM3623 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3623 include diagnosis, prevention and treatment of viral infection by Infectious hematopoietic necrosis virus. Specific functions, and accordingly utilities, of VGAM3623 correlate with, and may be deduced from, the identity of the host target genes which VGAM3623 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50692] Nucleotide sequences of the VGAM3623 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3623 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3623 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3623 are further described hereinbelow with reference to Table 1.

[50693] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3623 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50694] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3624 (VGAM3624) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50695] VGAM3624 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3624 was detected is described hereinabove with reference to Figs. 2-8.

[50696] VGAM3624 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3624 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50697] VGAM3624 gene, herein designated VGAM GENE, encodes a VGAM3624 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3624 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3624 precursor RNA is designated SEQ ID:82023, and is provided hereinbelow with reference to the sequence listing part.

[50698] VGAM3624 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3624 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50699] An enzyme complex designated DICER COMPLEX, dices the VGAM3624 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3624 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3624 RNA is designated SEQ ID:82024, and is provided hereinbelow with reference to the sequence listing part.

[50700] VGAM3624 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3624 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3624 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50701] VGAM3624 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3624 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3624 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3624 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3624 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50702] The complementary binding of VGAM3624 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3624 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3624 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3624 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50703] It is appreciated that VGAM3624 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3624 host target genes. The mRNA of each one of this plurality of VGAM3624 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3624 RNA, herein designated VGAM RNA, and which when bound by VGAM3624 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3624 host target proteins.

[50704] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3624 gene, herein designated VGAM GENE, on one or more VGAM3624 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50705] It is yet further appreciated that a function of VGAM3624 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3624 include diagnosis, prevention and

treatment of viral infection by *Melanoplus sanguinipes* entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3624 correlate with, and may be deduced from, the identity of the host target genes which VGAM3624 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50706] Nucleotide sequences of the VGAM3624 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3624 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3624 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3624 are further described hereinbelow with reference to Table 1.

[50707] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3624 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50708] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3625 (VGAM3625) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50709] VGAM3625 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3625 was detected is described hereinabove with reference to Figs. 2–8.

[50710] VGAM3625 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Potato leafroll virus. VGAM3625 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50711] VGAM3625 gene, herein designated VGAM GENE, encodes a VGAM3625 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3625 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3625 precursor RNA is designated SEQ ID:82029, and is provided hereinbelow with reference to the sequence listing part.

[50712] VGAM3625 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3625 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50713] An enzyme complex designated DICER COMPLEX, dices the VGAM3625 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3625 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3625 RNA is designated SEQ ID:82030, and is provided hereinbelow with reference to the sequence listing part.

[50714] VGAM3625 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3625 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3625 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50715] VGAM3625 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3625 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3625 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3625 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3625 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50716] The complementary binding of VGAM3625 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3625 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3625 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3625 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50717] It is appreciated that VGAM3625 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3625 host target genes. The mRNA of each one of this plurality of VGAM3625 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3625 RNA, herein designated VGAM RNA, and which when bound by VGAM3625 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3625 host target proteins.

[50718] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3625 gene, herein designated VGAM GENE, on one or more VGAM3625 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50719] It is yet further appreciated that a function of VGAM3625 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3625 include diagnosis, prevention and treatment of viral infection by Potato leafroll virus. Specific

functions, and accordingly utilities, of VGAM3625 correlate with, and may be deduced from, the identity of the host target genes which VGAM3625 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50720] Nucleotide sequences of the VGAM3625 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3625 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3625 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3625 are further described hereinbelow with reference to Table 1.

[50721] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3625 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50722] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3626 (VGAM3626) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[50723] VGAM3626 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3626 was detected is described hereinabove with reference to Figs. 2–8.

[50724] VGAM3626 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3626 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50725] VGAM3626 gene, herein designated VGAM GENE, encodes a VGAM3626 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3626 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3626 precursor RNA is designated SEQ ID:82043, and is provided hereinbelow with reference to the sequence listing part.

[50726] VGAM3626 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3626 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50727] An enzyme complex designated DICER COMPLEX, dices the VGAM3626 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3626 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3626 RNA is designated SEQ ID:82044, and is provided hereinbelow with reference to the sequence listing part.

[50728] VGAM3626 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3626 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3626 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50729] VGAM3626 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3626 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3626 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3626 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3626 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50730] The complementary binding of VGAM3626 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3626 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3626 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3626 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50731] It is appreciated that VGAM3626 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3626 host target genes. The mRNA of each one of this plurality of VGAM3626 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3626 RNA, herein designated VGAM RNA, and which when bound by VGAM3626 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3626 host target proteins.

[50732] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3626 gene, herein designated VGAM GENE, on one or more VGAM3626 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50733] It is yet further appreciated that a function of VGAM3626 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3626 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3626 corre-

late with, and may be deduced from, the identity of the host target genes which VGAM3626 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50734] Nucleotide sequences of the VGAM3626 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3626 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3626 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3626 are further described hereinbelow with reference to Table 1.

[50735] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3626 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50736] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3627 (VGAM3627) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[50737] VGAM3627 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3627 was detected is described hereinabove with reference to Figs. 2–8.

[50738] VGAM3627 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rabbit fibroma virus. VGAM3627 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50739] VGAM3627 gene, herein designated VGAM GENE, encodes a VGAM3627 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3627 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3627 precursor RNA is designated SEQ ID:82053, and is provided hereinbelow with reference to the sequence listing part.

[50740] VGAM3627 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3627 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50741] An enzyme complex designated DICER COMPLEX, dices the VGAM3627 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3627 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3627 RNA is designated SEQ ID:82054, and is provided hereinbelow with reference to the sequence listing part.

[50742] VGAM3627 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3627 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3627 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50743] VGAM3627 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3627 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3627 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3627 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3627 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50744] The complementary binding of VGAM3627 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3627 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3627 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3627 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50745] It is appreciated that VGAM3627 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3627 host target genes. The mRNA of each one of this plurality of VGAM3627 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3627 RNA, herein designated VGAM RNA, and which when bound by VGAM3627 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3627 host target proteins.

[50746] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3627 gene, herein designated VGAM GENE, on one or more VGAM3627 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50747] It is yet further appreciated that a function of VGAM3627 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3627 include diagnosis, prevention and treatment of viral infection by Rabbit fibroma virus. Specific functions, and accordingly utilities, of VGAM3627 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3627 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50748] Nucleotide sequences of the VGAM3627 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3627 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3627 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3627 are further described hereinbelow with reference to Table 1.

[50749] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3627 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50750] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3628 (VGAM3628) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50751] VGAM3628 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3628 was detected is described hereinabove with reference to Figs. 2–8.

[50752] VGAM3628 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine papillomavirus. VGAM3628 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50753] VGAM3628 gene, herein designated VGAM GENE, encodes a VGAM3628 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3628 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3628 precursor RNA is designated SEQ ID:82062, and is provided hereinbelow with reference to the sequence listing part.

[50754] VGAM3628 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3628 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50755] An enzyme complex designated DICER COMPLEX, dices the VGAM3628 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3628 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3628 RNA is designated SEQ ID:82063, and is provided hereinbelow with reference to the sequence listing part.

[50756] VGAM3628 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3628 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3628 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50757] VGAM3628 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3628 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3628 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3628 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3628 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50758] The complementary binding of VGAM3628 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3628 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3628 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3628 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50759] It is appreciated that VGAM3628 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3628 host target genes. The mRNA of each one of this plurality of VGAM3628 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3628 RNA, herein designated VGAM RNA, and which when bound by VGAM3628 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3628 host target proteins.

[50760] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3628 gene, herein designated VGAM GENE, on one or more VGAM3628 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50761] It is yet further appreciated that a function of VGAM3628 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3628 include diagnosis, prevention and treatment of viral infection by Bovine papillomavirus. Specific functions, and accordingly utilities, of VGAM3628 correlate with, and may be deduced from, the identity of the host target genes which VGAM3628 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[50762] Nucleotide sequences of the VGAM3628 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3628 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3628 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3628 are further described hereinbelow with reference to Table 1.

[50763] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3628 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50764] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3629 (VGAM3629) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50765] VGAM3629 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3629 was detected is described hereinabove with reference to Figs. 2–8.

[50766] VGAM3629 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Mumps virus.

VGAM3629 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50767] VGAM3629 gene, herein designated VGAM GENE, encodes a VGAM3629 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3629 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3629 precursor RNA is designated SEQ ID:82070, and is provided hereinbelow with reference to the sequence listing part.

[50768] VGAM3629 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3629 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50769] An enzyme complex designated DICER COMPLEX, dices the VGAM3629 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3629 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3629 RNA is designated SEQ ID:82071, and is provided hereinbelow with reference to the sequence listing part.

[50770] VGAM3629 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3629 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3629 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50771] VGAM3629 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3629 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3629 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3629 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3629 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[50772] The complementary binding of VGAM3629 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3629 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3629 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3629 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50773] It is appreciated that VGAM3629 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3629 host target genes. The mRNA of each one of this plurality of VGAM3629 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3629 RNA, herein designated VGAM RNA, and which when bound by VGAM3629 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3629 host target proteins.

[50774] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3629 gene, herein designated VGAM GENE, on one or more VGAM3629 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50775] It is yet further appreciated that a function of VGAM3629 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3629 include diagnosis, prevention and treatment of viral infection by Mumps virus. Specific functions, and accordingly utilities, of VGAM3629 correlate with, and may be deduced from, the identity of the host target genes which VGAM3629 binds and inhibits, and the function of these host target genes, as elaborated herein—

below.

[50776] Nucleotide sequences of the VGAM3629 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3629 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3629 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3629 are further described hereinbelow with reference to Table 1.

[50777] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3629 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50778] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3630 (VGAM3630) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50779] VGAM3630 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3630 was detected is described hereinabove with reference to Figs. 2–8.

[50780] VGAM3630 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3630 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50781] VGAM3630 gene, herein designated VGAM GENE, encodes a VGAM3630 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3630 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3630 precursor RNA is designated SEQ ID:82092, and is provided hereinbelow with reference to the sequence listing part.

[50782] VGAM3630 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3630 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50783] An enzyme complex designated DICER COMPLEX, dices the VGAM3630 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3630 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3630 RNA is designated SEQ ID:82093, and is provided hereinbelow with reference to the sequence listing part.

[50784] VGAM3630 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3630 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3630 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[50785] VGAM3630 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3630 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3630 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3630 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3630 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50786] The complementary binding of VGAM3630 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3630 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3630 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3630 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50787] It is appreciated that VGAM3630 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3630 host target genes. The mRNA of each one of this plurality of VGAM3630 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3630 RNA, herein designated VGAM RNA, and which when bound by VGAM3630 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3630 host target proteins.

[50788] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3630 gene, herein designated VGAM GENE, on one

or more VGAM3630 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50789] It is yet further appreciated that a function of VGAM3630 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3630 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3630 correlate with, and may be deduced from, the identity of the host target genes which VGAM3630 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50790] Nucleotide sequences of the VGAM3630 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3630 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3630 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3630 are further described hereinbelow with reference to Table 1.

[50791] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3630 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50792] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3631 (VGAM3631) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50793] VGAM3631 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3631 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[50794] VGAM3631 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3631 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50795] VGAM3631 gene, herein designated VGAM GENE, encodes a VGAM3631 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3631 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3631 precursor RNA is designated SEQ ID:82124, and is provided hereinbelow with reference to the sequence listing part.

[50796] VGAM3631 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3631 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50797] An enzyme complex designated DICER COMPLEX, dices the VGAM3631 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3631 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3631 RNA is designated SEQ ID:82125, and is provided hereinbelow with reference to the sequence listing part.

[50798] VGAM3631 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3631 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3631 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50799] VGAM3631 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3631 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3631 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3631 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3631 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50800] The complementary binding of VGAM3631 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3631 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3631 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3631 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50801] It is appreciated that VGAM3631 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3631 host target genes. The mRNA of each one of this plurality of VGAM3631 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3631 RNA, herein designated VGAM RNA, and which when bound by VGAM3631 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3631 host target proteins.

[50802] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3631 gene, herein designated VGAM GENE, on one or more VGAM3631 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50803] It is yet further appreciated that a function of VGAM3631 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3631 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3631 correlate with, and may be deduced from, the identity of the host target genes which VGAM3631 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50804] Nucleotide sequences of the VGAM3631 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3631 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3631 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3631 are further described hereinbelow with reference to Table 1.

[50805] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3631 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50806] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3632 (VGAM3632) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50807] VGAM3632 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3632 was detected is described hereinabove with reference to Figs. 2-8.

[50808] VGAM3632 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ictalurid herpesvirus 1. VGAM3632 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50809] VGAM3632 gene, herein designated VGAM GENE, encodes a VGAM3632 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3632 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3632 precursor RNA is designated SEQ ID:82134, and is provided hereinbelow with reference to the sequence listing part.

[50810] VGAM3632 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3632 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[50811] An enzyme complex designated DICER COMPLEX, dices the VGAM3632 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3632 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3632 RNA is designated SEQ ID:82135, and is provided hereinbelow with reference to the sequence listing part.

[50812] VGAM3632 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3632 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3632 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50813] VGAM3632 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3632 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3632 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3632 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3632 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50814] The complementary binding of VGAM3632 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3632 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3632 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3632 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50815] It is appreciated that VGAM3632 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3632 host target genes. The mRNA of each one of this plurality of VGAM3632 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3632 RNA, herein designated VGAM RNA, and which when bound by VGAM3632 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3632 host target proteins.

[50816] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3632 gene, herein designated VGAM GENE, on one or more VGAM3632 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50817] It is yet further appreciated that a function of VGAM3632 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3632 include diagnosis, prevention and treatment of viral infection by Ictalurid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3632 correlate with, and may be deduced from, the identity of the host target genes which VGAM3632 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50818] Nucleotide sequences of the VGAM3632 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3632 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3632 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3632 are further described hereinbelow with reference to Table 1.

[50819] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3632 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50820] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3633 (VGAM3633) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50821] VGAM3633 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3633 was detected is described hereinabove with reference to Figs. 2-8.

[50822] VGAM3633 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Camelpox virus.

VGAM3633 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50823] VGAM3633 gene, herein designated VGAM GENE, encodes a VGAM3633 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3633 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3633 precursor RNA is designated SEQ ID:82139, and is provided hereinbelow with reference to the sequence listing part.

[50824] VGAM3633 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3633 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50825] An enzyme complex designated DICER COMPLEX, dices the VGAM3633 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3633 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3633 RNA is designated SEQ ID:82140, and is provided hereinbelow with reference to the sequence listing part.

[50826] VGAM3633 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3633 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3633 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50827] VGAM3633 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3633 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3633 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3633 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3633 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50828] The complementary binding of VGAM3633 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3633 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3633 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3633 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50829] It is appreciated that VGAM3633 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3633 host target genes. The mRNA of each one of this plurality of VGAM3633 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3633 RNA, herein designated VGAM RNA, and which when bound by VGAM3633 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3633 host target proteins.

[50830] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3633 gene, herein designated VGAM GENE, on one or more VGAM3633 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50831] It is yet further appreciated that a function of VGAM3633 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3633 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3633 correlate with, and may be deduced from, the identity of the host target genes which VGAM3633 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50832] Nucleotide sequences of the VGAM3633 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3633 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3633 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3633 are further described hereinbelow with reference to Table 1.

[50833] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3633 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50834] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3634 (VGAM3634) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50835] VGAM3634 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3634 was detected is described hereinabove with reference to Figs. 2-8.

[50836] VGAM3634 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3634 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50837] VGAM3634 gene, herein designated VGAM GENE, encodes a VGAM3634 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3634 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3634 precursor RNA is designated SEQ ID:82143, and is provided hereinbelow with reference to the sequence listing part.

[50838] VGAM3634 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3634 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50839] An enzyme complex designated DICER COMPLEX, dices

the VGAM3634 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3634 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3634 RNA is designated SEQ ID:82144, and is provided hereinbelow with reference to the sequence listing part.

[50840] VGAM3634 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3634 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3634 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50841] VGAM3634 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3634 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3634 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3634 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3634 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50842] The complementary binding of VGAM3634 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3634 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3634 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3634 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50843] It is appreciated that VGAM3634 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3634 host target genes. The mRNA of each one of this plurality of VGAM3634 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3634 RNA, herein designated VGAM RNA, and which when bound by VGAM3634 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3634 host target proteins.

[50844] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3634 gene, herein designated VGAM GENE, on one or more VGAM3634 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50845] It is yet further appreciated that a function of VGAM3634 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3634 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3634 correlate with, and may be deduced from, the identity of the host target genes which VGAM3634 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50846] Nucleotide sequences of the VGAM3634 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3634 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3634 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3634 are further described hereinbelow with reference to Table 1.

[50847] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3634 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50848] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3635 (VGAM3635) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50849] VGAM3635 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3635 was detected is described hereinabove with reference to Figs. 2-8.

[50850] VGAM3635 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3635 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50851] VGAM3635 gene, herein designated VGAM GENE, encodes a VGAM3635 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3635 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3635 precursor RNA is designated SEQ ID:82149, and is provided hereinbelow with reference to the sequence listing part.

[50852] VGAM3635 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3635 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50853] An enzyme complex designated DICER COMPLEX, dices the VGAM3635 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3635 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3635 RNA is designated SEQ ID:82150, and is provided hereinbelow with reference to the sequence listing part.

[50854] VGAM3635 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3635 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3635 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50855] VGAM3635 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3635 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3635 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3635 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3635 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50856] The complementary binding of VGAM3635 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3635 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3635

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3635 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50857] It is appreciated that VGAM3635 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3635 host target genes. The mRNA of each one of this plurality of VGAM3635 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3635 RNA, herein designated VGAM RNA, and which when bound by VGAM3635 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3635 host target proteins.

[50858] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3635 gene, herein designated VGAM GENE, on one or more VGAM3635 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50859] It is yet further appreciated that a function of VGAM3635 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3635 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3635 correlate with, and may be deduced from, the identity of the host target genes which VGAM3635 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50860] Nucleotide sequences of the VGAM3635 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3635 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3635 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3635 are further described hereinbelow with reference to Table 1.

[50861] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3635 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50862] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3636 (VGAM3636) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50863] VGAM3636 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3636 was detected is described hereinabove with reference to Figs. 2-8.

[50864] VGAM3636 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3636 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene con-

tained in the human genome.

[50865] VGAM3636 gene, herein designated VGAM GENE, encodes a VGAM3636 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3636 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3636 precursor RNA is designated SEQ ID:82154, and is provided hereinbelow with reference to the sequence listing part.

[50866] VGAM3636 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3636 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50867] An enzyme complex designated DICER COMPLEX, dices the VGAM3636 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3636 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3636 RNA is designated SEQ ID:82155, and is provided hereinbelow with reference to the sequence listing part.

[50868] VGAM3636 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3636 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3636 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50869] VGAM3636 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3636 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3636 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3636 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3636 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50870] The complementary binding of VGAM3636 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3636 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3636 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3636 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50871] It is appreciated that VGAM3636 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3636 host target genes. The mRNA of each one of this plurality of VGAM3636 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3636 RNA, herein designated VGAM RNA, and which when bound by VGAM3636 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3636 host target proteins.

[50872] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3636 gene, herein designated VGAM GENE, on one or more VGAM3636 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50873] It is yet further appreciated that a function of VGAM3636 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3636 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3636 correlate with, and may be deduced from, the identity of the host target genes which VGAM3636 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50874] Nucleotide sequences of the VGAM3636 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3636 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3636 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3636 are further

described hereinbelow with reference to Table 1.

[50875] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3636 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50876] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3637 (VGAM3637) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50877] VGAM3637 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3637 was detected is described hereinabove with reference to Figs. 2-8.

[50878] VGAM3637 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6. VGAM3637 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50879] VGAM3637 gene, herein designated VGAM GENE, encodes a VGAM3637 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3637 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3637 precursor RNA is designated SEQ ID:82167, and is provided hereinbelow with reference to the sequence listing part.

[50880] VGAM3637 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3637 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50881] An enzyme complex designated DICER COMPLEX, dices the VGAM3637 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3637 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3637 RNA is designated SEQ ID:82168, and is provided hereinbelow with reference to the sequence listing part.

[50882] VGAM3637 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3637 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3637 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50883] VGAM3637 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3637 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3637 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3637 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3637 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50884] The complementary binding of VGAM3637 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3637 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3637 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3637 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50885] It is appreciated that VGAM3637 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3637 host target genes. The mRNA of each one of this plurality of VGAM3637 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3637 RNA, herein designated VGAM RNA, and which when bound by VGAM3637 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3637 host target proteins.

[50886] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3637 gene, herein designated VGAM GENE, on one or more VGAM3637 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50887] It is yet further appreciated that a function of VGAM3637 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3637 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6. Specific functions, and accordingly utilities, of VGAM3637 correlate with, and may be deduced from, the identity of the host target genes which VGAM3637 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50888] Nucleotide sequences of the VGAM3637 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3637 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3637 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3637 are further described hereinbelow with reference to Table 1.

[50889] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3637 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50890] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3638 (VGAM3638) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50891] VGAM3638 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3638 was detected is described hereinabove with reference to Figs. 2-8.

[50892] VGAM3638 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6. VGAM3638 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50893] VGAM3638 gene, herein designated VGAM GENE, encodes

a VGAM3638 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3638 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3638 precursor RNA is designated SEQ ID:82175, and is provided hereinbelow with reference to the sequence listing part.

[50894] VGAM3638 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3638 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50895] An enzyme complex designated DICER COMPLEX, dices the VGAM3638 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3638 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3638 RNA is designated SEQ ID:82176, and is provided hereinbelow with reference to the sequence listing part.

[50896] VGAM3638 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3638 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3638 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50897] VGAM3638 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3638 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3638 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3638 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3638 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50898] The complementary binding of VGAM3638 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3638 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3638 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3638 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[50899] It is appreciated that VGAM3638 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3638 host target genes. The mRNA of each one of this plurality of VGAM3638 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3638 RNA, herein designated VGAM RNA, and which when bound by VGAM3638 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3638 host target proteins.

[50900] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3638 gene, herein designated VGAM GENE, on one or more VGAM3638 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50901] It is yet further appreciated that a function of VGAM3638 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3638 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6. Specific functions, and accordingly utilities, of VGAM3638 correlate with, and may be deduced from, the identity of the host target genes which VGAM3638 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50902] Nucleotide sequences of the VGAM3638 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3638 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3638 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3638 are further described hereinbelow with reference to Table 1.

[50903] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3638 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50904] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3639 (VGAM3639) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50905] VGAM3639 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3639 was detected is described hereinabove with reference to Figs. 2-8.

[50906] VGAM3639 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3639 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50907] VGAM3639 gene, herein designated VGAM GENE, encodes a VGAM3639 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3639 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3639 precursor RNA is designated SEQ ID:82182, and is provided hereinbelow with reference to the sequence listing part.

[50908] VGAM3639 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3639 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50909] An enzyme complex designated DICER COMPLEX, dices the VGAM3639 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3639 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3639 RNA is designated SEQ ID:82183, and is provided hereinbelow with reference to the sequence listing part.

[50910] VGAM3639 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3639 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3639 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50911] VGAM3639 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3639 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3639 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3639 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3639 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50912] The complementary binding of VGAM3639 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3639 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3639 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3639 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50913] It is appreciated that VGAM3639 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3639 host target genes. The mRNA of each one of this plurality of VGAM3639 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3639 RNA, herein designated VGAM RNA, and which when bound by VGAM3639 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3639 host target proteins.

[50914] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3639 gene, herein designated VGAM GENE, on one or more VGAM3639 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50915] It is yet further appreciated that a function of VGAM3639 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3639 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3639 correlate with, and may be deduced from, the identity of the host target genes which VGAM3639 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50916] Nucleotide sequences of the VGAM3639 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3639 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3639 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3639 are further described hereinbelow with reference to Table 1.

[50917] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3639 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50918] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3640 (VGAM3640) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50919] VGAM3640 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3640 was detected is described hereinabove with reference to Figs. 2-8.

[50920] VGAM3640 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Impatiens necrotic spot virus. VGAM3640 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50921] VGAM3640 gene, herein designated VGAM GENE, encodes a VGAM3640 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3640 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3640 precursor RNA is designated SEQ ID:82231, and is provided hereinbelow with reference to the sequence listing part.

[50922] VGAM3640 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3640 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50923] An enzyme complex designated DICER COMPLEX, dices the VGAM3640 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3640 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3640 RNA is designated SEQ ID:82232, and is provided hereinbelow with reference to the sequence listing part.

[50924] VGAM3640 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3640 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3640 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50925] VGAM3640 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3640 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3640 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3640 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3640 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50926] The complementary binding of VGAM3640 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3640 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3640 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3640 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50927] It is appreciated that VGAM3640 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3640 host target genes. The mRNA of each one of this plurality of VGAM3640 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3640 RNA, herein designated VGAM RNA, and which when bound by VGAM3640 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3640 host target proteins.

[50928] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3640 gene, herein designated VGAM GENE, on one or more VGAM3640 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50929] It is yet further appreciated that a function of VGAM3640 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3640 include diagnosis, prevention and treatment of viral infection by Impatiens necrotic spot virus. Specific functions, and accordingly utilities, of VGAM3640 correlate with, and may be deduced from, the identity of the host target genes which VGAM3640 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50930] Nucleotide sequences of the VGAM3640 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3640 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3640 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3640 are further described hereinbelow with reference to Table 1.

[50931] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3640 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50932] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3641 (VGAM3641) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50933] VGAM3641 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3641 was detected is described hereinabove with reference to Figs. 2–8.

[50934] VGAM3641 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3641 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50935] VGAM3641 gene, herein designated VGAM GENE, encodes a VGAM3641 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3641 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3641 precursor RNA is designated SEQ ID:82236, and is provided hereinbelow with reference to the sequence listing part.

[50936] VGAM3641 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3641 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50937] An enzyme complex designated DICER COMPLEX, dices the VGAM3641 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3641 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3641 RNA is designated SEQ ID:82237, and is provided hereinbelow with reference to the sequence listing part.

[50938] VGAM3641 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3641 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3641 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50939] VGAM3641 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3641 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3641 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3641 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3641 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50940] The complementary binding of VGAM3641 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3641 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3641 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3641 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50941] It is appreciated that VGAM3641 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3641 host target genes. The mRNA of each one of this plurality of VGAM3641 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3641 RNA, herein designated VGAM RNA, and which when bound by VGAM3641 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3641 host target proteins.

[50942] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3641 gene, herein designated VGAM GENE, on one or more VGAM3641 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[50943] It is yet further appreciated that a function of VGAM3641 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3641 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3641 correlate with, and may be deduced from, the identity of the host target genes which VGAM3641 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50944] Nucleotide sequences of the VGAM3641 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3641 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3641 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3641 are further described hereinbelow with reference to Table 1.

[50945] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3641 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50946] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3642 (VGAM3642) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50947] VGAM3642 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3642 was detected is described hereinabove with reference to Figs. 2-8.

[50948] VGAM3642 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-1. VGAM3642 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50949] VGAM3642 gene, herein designated VGAM GENE, encodes a VGAM3642 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3642 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3642 precursor RNA is designated SEQ ID:82260, and is provided hereinbelow with reference to the sequence listing part.

[50950] VGAM3642 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3642 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50951] An enzyme complex designated DICER COMPLEX, dices the VGAM3642 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3642 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3642 RNA is designated SEQ ID:82261, and is provided hereinbelow with reference to the sequence listing part.

[50952] VGAM3642 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3642 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3642 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50953] VGAM3642 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3642 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3642 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3642 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3642 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50954] The complementary binding of VGAM3642 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3642 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3642 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3642 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50955] It is appreciated that VGAM3642 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3642 host target genes. The mRNA of

each one of this plurality of VGAM3642 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3642 RNA, herein designated VGAM RNA, and which when bound by VGAM3642 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3642 host target proteins.

[50956] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3642 gene, herein designated VGAM GENE, on one or more VGAM3642 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[50957] It is yet further appreciated that a function of VGAM3642 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3642 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-1. Specific functions, and accordingly utilities, of VGAM3642 correlate with, and may be deduced from, the identity of the host target genes which VGAM3642 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50958] Nucleotide sequences of the VGAM3642 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3642 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3642 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3642 are further described hereinbelow with reference to Table 1.

[50959] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3642 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[50960] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3643 (VGAM3643) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50961] VGAM3643 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3643 was detected is described hereinabove with reference to Figs. 2–8.

[50962] VGAM3643 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sonchus yellow net virus. VGAM3643 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50963] VGAM3643 gene, herein designated VGAM GENE, encodes a VGAM3643 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3643 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3643 precursor RNA is designated SEQ ID:82271, and is provided hereinbelow with reference to the sequence listing part.

[50964] VGAM3643 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3643 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50965] An enzyme complex designated DICER COMPLEX, dices the VGAM3643 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3643 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3643 RNA is designated SEQ ID:82272,

and is provided hereinbelow with reference to the sequence listing part.

[50966] VGAM3643 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3643 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3643 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50967] VGAM3643 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3643 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3643 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3643 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3643 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50968] The complementary binding of VGAM3643 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3643 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3643 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3643 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50969] It is appreciated that VGAM3643 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3643 host target genes. The mRNA of each one of this plurality of VGAM3643 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3643 RNA, herein designated VGAM RNA, and which when bound by VGAM3643 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3643 host target proteins.

[50970] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3643 gene, herein designated VGAM GENE, on one or more VGAM3643 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50971] It is yet further appreciated that a function of VGAM3643 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3643 include diagnosis, prevention and treatment of viral infection by Sonchus yellow net virus. Specific functions, and accordingly utilities, of VGAM3643 correlate with, and may be deduced from, the identity of the host target genes which VGAM3643 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50972] Nucleotide sequences of the VGAM3643 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3643 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3643 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3643 are further described hereinbelow with reference to Table 1.

[50973] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3643 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50974] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3644 (VGAM3644) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50975] VGAM3644 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3644 was detected is described hereinabove with reference to Figs. 2-8.

[50976] VGAM3644 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Porcine reproductive and respiratory syndrome virus. VGAM3644 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50977] VGAM3644 gene, herein designated VGAM GENE, encodes a VGAM3644 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3644 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3644 precursor RNA is designated SEQ ID:82317, and is provided hereinbelow with reference to the sequence listing part.

[50978] VGAM3644 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3644 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50979] An enzyme complex designated DICER COMPLEX, dices the VGAM3644 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3644 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3644 RNA is designated SEQ ID:82318, and is provided hereinbelow with reference to the sequence listing part.

[50980] VGAM3644 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3644 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3644 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50981] VGAM3644 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3644 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3644 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3644 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3644 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50982] The complementary binding of VGAM3644 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3644 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3644 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3644 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50983] It is appreciated that VGAM3644 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3644 host target genes. The mRNA of each one of this plurality of VGAM3644 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3644 RNA, herein designated VGAM RNA, and which when bound by VGAM3644 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3644 host target proteins.

[50984] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3644 gene, herein designated VGAM GENE, on one or more VGAM3644 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[50985] It is yet further appreciated that a function of VGAM3644 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3644 include diagnosis, prevention and treatment of viral infection by Porcine reproductive and respiratory syndrome virus. Specific functions, and accordingly utilities, of VGAM3644 correlate with, and may be deduced from, the identity of the host target genes which VGAM3644 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[50986] Nucleotide sequences of the VGAM3644 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3644 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3644 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3644 are further described hereinbelow with reference to Table 1.

[50987] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3644 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[50988] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3645 (VGAM3645) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[50989] VGAM3645 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3645 was detected is described hereinabove with reference to Figs. 2–8.

[50990] VGAM3645 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Porcine reproductive and respiratory syndrome virus. VGAM3645 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[50991] VGAM3645 gene, herein designated VGAM GENE, encodes a VGAM3645 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3645 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3645 precursor RNA is designated SEQ ID:82387, and is provided hereinbelow with reference to the sequence listing part.

[50992] VGAM3645 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3645 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[50993] An enzyme complex designated DICER COMPLEX, dices the VGAM3645 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3645 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3645 RNA is designated SEQ ID:82388, and is provided hereinbelow with reference to the sequence listing part.

[50994] VGAM3645 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3645 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3645 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[50995] VGAM3645 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3645 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3645 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3645 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3645 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[50996] The complementary binding of VGAM3645 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3645 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3645 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3645 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[50997] It is appreciated that VGAM3645 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3645 host target genes. The mRNA of each one of this plurality of VGAM3645 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3645 RNA, herein designated VGAM RNA, and which when bound by VGAM3645 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3645 host target proteins.

[50998] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3645 gene, herein designated VGAM GENE, on one or more VGAM3645 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [50999] It is yet further appreciated that a function of VGAM3645 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3645 include diagnosis, prevention and treatment of viral infection by Porcine reproductive and respiratory syndrome virus. Specific functions, and accordingly utilities, of VGAM3645 correlate with, and may be deduced from, the identity of the host target genes which VGAM3645 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [51000] Nucleotide sequences of the VGAM3645 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3645 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3645 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3645 are further described hereinbelow with reference to Table 1.
- [51001] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3645 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51002] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3646 (VGAM3646) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51003] VGAM3646 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3646 was detected is described hereinabove with reference to Figs. 2-8.

[51004] VGAM3646 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3646 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51005] VGAM3646 gene, herein designated VGAM GENE, encodes a VGAM3646 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3646 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3646 precursor RNA is designated SEQ ID:82420, and is provided hereinbelow with reference to the sequence listing part.

[51006] VGAM3646 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3646 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51007] An enzyme complex designated DICER COMPLEX, dices the VGAM3646 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3646 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3646 RNA is designated SEQ ID:82421, and is provided hereinbelow with reference to the sequence listing part.

[51008] VGAM3646 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3646 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3646 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51009] VGAM3646 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3646 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3646 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3646 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3646 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51010] The complementary binding of VGAM3646 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3646 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3646 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3646 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51011] It is appreciated that VGAM3646 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3646 host target genes. The mRNA of

each one of this plurality of VGAM3646 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3646 RNA, herein designated VGAM RNA, and which when bound by VGAM3646 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3646 host target proteins.

[51012] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3646 gene, herein designated VGAM GENE, on one or more VGAM3646 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[51013] It is yet further appreciated that a function of VGAM3646 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3646 include diagnosis, prevention and treatment of viral infection by *Paramecium bursaria* Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3646 correlate with, and may be deduced from, the identity of the host target genes which VGAM3646 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51014] Nucleotide sequences of the VGAM3646 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3646 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3646 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3646 are further described hereinbelow with reference to Table 1.

[51015] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3646 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[51016] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3647 (VGAM3647) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51017] VGAM3647 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3647 was detected is described hereinabove with reference to Figs. 2–8.

[51018] VGAM3647 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3647 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51019] VGAM3647 gene, herein designated VGAM GENE, encodes a VGAM3647 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3647 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3647 precursor RNA is designated SEQ ID:82424, and is provided hereinbelow with reference to the sequence listing part.

[51020] VGAM3647 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3647 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51021] An enzyme complex designated DICER COMPLEX, dices the VGAM3647 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3647 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3647 RNA is designated SEQ ID:82425,

and is provided hereinbelow with reference to the sequence listing part.

[51022] VGAM3647 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3647 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3647 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51023] VGAM3647 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3647 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3647 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3647 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3647 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51024] The complementary binding of VGAM3647 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3647 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3647 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3647 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51025] It is appreciated that VGAM3647 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3647 host target genes. The mRNA of each one of this plurality of VGAM3647 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3647 RNA, herein designated VGAM RNA, and which when bound by VGAM3647 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3647 host target proteins.

[51026] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3647 gene, herein designated VGAM GENE, on one or more VGAM3647 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51027] It is yet further appreciated that a function of VGAM3647 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3647 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3647 correlate with, and may be deduced from, the identity of the host target genes which VGAM3647 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51028] Nucleotide sequences of the VGAM3647 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3647 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3647 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3647 are further described hereinbelow with reference to Table 1.

[51029] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3647 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51030] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3648 (VGAM3648) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51031] VGAM3648 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3648 was detected is described hereinabove with reference to Figs. 2–8.

[51032] VGAM3648 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3648 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51033] VGAM3648 gene, herein designated VGAM GENE, encodes a VGAM3648 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3648 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3648 precursor

sor RNA is designated SEQ ID:82434, and is provided hereinbelow with reference to the sequence listing part.

[51034] VGAM3648 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3648 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51035] An enzyme complex designated DICER COMPLEX, dices the VGAM3648 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3648 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3648 RNA is designated SEQ ID:82435, and is provided hereinbelow with reference to the se-

quence listing part.

[51036] VGAM3648 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3648 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3648 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51037] VGAM3648 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3648 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3648 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3648 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3648 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51038] The complementary binding of VGAM3648 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3648 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3648 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3648 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51039] It is appreciated that VGAM3648 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3648 host target genes. The mRNA of each one of this plurality of VGAM3648 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3648 RNA, herein designated VGAM RNA, and which when bound by VGAM3648 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3648 host target proteins.

[51040] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3648 gene, herein designated VGAM GENE, on one or more VGAM3648 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51041] It is yet further appreciated that a function of VGAM3648

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3648 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3648 correlate with, and may be deduced from, the identity of the host target genes which VGAM3648 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51042] Nucleotide sequences of the VGAM3648 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3648 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3648 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3648 are further described hereinbelow with reference to Table 1.

[51043] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3648 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51044] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3649 (VGAM3649) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51045] VGAM3649 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3649 was detected is described hereinabove with reference to Figs. 2–8.

[51046] VGAM3649 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3649 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51047] VGAM3649 gene, herein designated VGAM GENE, encodes a VGAM3649 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3649 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3649 precursor RNA is designated SEQ ID:82452, and is provided

hereinbelow with reference to the sequence listing part.

[51048] VGAM3649 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3649 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51049] An enzyme complex designated DICER COMPLEX, dices the VGAM3649 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3649 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3649 RNA is designated SEQ ID:82453, and is provided hereinbelow with reference to the sequence listing part.

[51050] VGAM3649 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3649 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3649 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51051] VGAM3649 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3649 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3649 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3649 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3649 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51052] The complementary binding of VGAM3649 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3649 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3649 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3649 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51053] It is appreciated that VGAM3649 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3649 host target genes. The mRNA of each one of this plurality of VGAM3649 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3649 RNA, herein designated VGAM RNA, and which when bound by VGAM3649 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3649 host target proteins.

[51054] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3649 gene, herein designated VGAM GENE, on one or more VGAM3649 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51055] It is yet further appreciated that a function of VGAM3649 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3649 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3649 correlate with, and may be deduced from, the identity of the host target genes which VGAM3649 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51056] Nucleotide sequences of the VGAM3649 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3649 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3649 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3649 are further described hereinbelow with reference to Table 1.

[51057] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3649 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51058] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3650 (VGAM3650) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51059] VGAM3650 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3650 was detected is described hereinabove with reference to Figs. 2–8.

[51060] VGAM3650 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human adenovirus C. VGAM3650 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51061] VGAM3650 gene, herein designated VGAM GENE, encodes a VGAM3650 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3650 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3650 precursor RNA is designated SEQ ID:82484, and is provided hereinbelow with reference to the sequence listing part.

[51062] VGAM3650 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3650 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51063] An enzyme complex designated DICER COMPLEX, dices the VGAM3650 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3650 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3650 RNA is designated SEQ ID:82485, and is provided hereinbelow with reference to the sequence listing part.

[51064] VGAM3650 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3650 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3650 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51065] VGAM3650 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3650 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3650 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3650 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3650 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51066] The complementary binding of VGAM3650 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3650 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3650 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3650 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51067] It is appreciated that VGAM3650 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3650 host target genes. The mRNA of each one of this plurality of VGAM3650 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3650 RNA, herein designated VGAM

RNA, and which when bound by VGAM3650 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3650 host target proteins.

[51068] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3650 gene, herein designated VGAM GENE, on one or more VGAM3650 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51069] It is yet further appreciated that a function of VGAM3650 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3650 include diagnosis, prevention and treatment of viral infection by Human adenovirus C. Specific functions, and accordingly utilities, of VGAM3650 correlate with, and may be deduced from, the identity of the host target genes which VGAM3650 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51070] Nucleotide sequences of the VGAM3650 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3650 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3650 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3650 are further described hereinbelow with reference to Table 1.

[51071] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3650 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51072] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3651 (VGAM3651) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51073] VGAM3651 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3651 was detected is described hereinabove with reference to Figs. 2–8.

[51074] VGAM3651 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human adenovirus B. VGAM3651 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51075] VGAM3651 gene, herein designated VGAM GENE, encodes a VGAM3651 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3651 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3651 precursor RNA is designated SEQ ID:82489, and is provided hereinbelow with reference to the sequence listing part.

[51076] VGAM3651 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3651 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51077] An enzyme complex designated DICER COMPLEX, dices the VGAM3651 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3651 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3651 RNA is designated SEQ ID:82490, and is provided hereinbelow with reference to the sequence listing part.

[51078] VGAM3651 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3651 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3651 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51079] VGAM3651 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3651 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3651 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3651 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3651 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51080] The complementary binding of VGAM3651 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3651 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3651 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3651 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51081] It is appreciated that VGAM3651 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3651 host target genes. The mRNA of each one of this plurality of VGAM3651 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3651 RNA, herein designated VGAM RNA, and which when bound by VGAM3651 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3651 host target proteins.

[51082] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3651 gene, herein designated VGAM GENE, on one or more VGAM3651 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51083] It is yet further appreciated that a function of VGAM3651 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3651 include diagnosis, prevention and

treatment of viral infection by Human adenovirus B. Specific functions, and accordingly utilities, of VGAM3651 correlate with, and may be deduced from, the identity of the host target genes which VGAM3651 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51084] Nucleotide sequences of the VGAM3651 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3651 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3651 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3651 are further described hereinbelow with reference to Table 1.

[51085] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3651 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51086] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3652 (VGAM3652) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51087] VGAM3652 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3652 was detected is described hereinabove with reference to Figs. 2–8.

[51088] VGAM3652 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2. VGAM3652 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51089] VGAM3652 gene, herein designated VGAM GENE, encodes a VGAM3652 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3652 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3652 precursor RNA is designated SEQ ID:82521, and is provided hereinbelow with reference to the sequence listing part.

[51090] VGAM3652 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3652 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51091] An enzyme complex designated DICER COMPLEX, dices the VGAM3652 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3652 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3652 RNA is designated SEQ ID:82522, and is provided hereinbelow with reference to the sequence listing part.

[51092] VGAM3652 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3652 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3652 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51093] VGAM3652 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3652 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3652 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3652 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3652 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51094] The complementary binding of VGAM3652 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3652 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3652 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3652 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51095] It is appreciated that VGAM3652 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3652 host target genes. The mRNA of each one of this plurality of VGAM3652 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3652 RNA, herein designated VGAM RNA, and which when bound by VGAM3652 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3652 host target proteins.

[51096] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3652 gene, herein designated VGAM GENE, on one or more VGAM3652 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51097] It is yet further appreciated that a function of VGAM3652 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3652 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Spe-

cific functions, and accordingly utilities, of VGAM3652 correlate with, and may be deduced from, the identity of the host target genes which VGAM3652 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51098] Nucleotide sequences of the VGAM3652 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3652 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3652 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3652 are further described hereinbelow with reference to Table 1.

[51099] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3652 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51100] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3653 (VGAM3653) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[51101] VGAM3653 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3653 was detected is described hereinabove with reference to Figs. 2–8.

[51102] VGAM3653 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 8. VGAM3653 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51103] VGAM3653 gene, herein designated VGAM GENE, encodes a VGAM3653 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3653 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3653 precursor RNA is designated SEQ ID:82536, and is provided hereinbelow with reference to the sequence listing part.

[51104] VGAM3653 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3653 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51105] An enzyme complex designated DICER COMPLEX, dices the VGAM3653 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3653 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3653 RNA is designated SEQ ID:82537, and is provided hereinbelow with reference to the sequence listing part.

[51106] VGAM3653 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3653 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3653 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51107] VGAM3653 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3653 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3653 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3653 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3653 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51108] The complementary binding of VGAM3653 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3653 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3653 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3653 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51109] It is appreciated that VGAM3653 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3653 host target genes. The mRNA of each one of this plurality of VGAM3653 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3653 RNA, herein designated VGAM RNA, and which when bound by VGAM3653 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3653 host target proteins.

[51110] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3653 gene, herein designated VGAM GENE, on one or more VGAM3653 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51111] It is yet further appreciated that a function of VGAM3653 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3653 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 8. Specific functions, and accordingly utilities, of VGAM3653

correlate with, and may be deduced from, the identity of the host target genes which VGAM3653 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51112] Nucleotide sequences of the VGAM3653 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3653 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3653 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3653 are further described hereinbelow with reference to Table 1.

[51113] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3653 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51114] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3654 (VGAM3654) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[51115] VGAM3654 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3654 was detected is described hereinabove with reference to Figs. 2–8.

[51116] VGAM3654 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3654 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51117] VGAM3654 gene, herein designated VGAM GENE, encodes a VGAM3654 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3654 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3654 precursor RNA is designated SEQ ID:82543, and is provided hereinbelow with reference to the sequence listing part.

[51118] VGAM3654 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3654 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51119] An enzyme complex designated DICER COMPLEX, dices the VGAM3654 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3654 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3654 RNA is designated SEQ ID:82544, and is provided hereinbelow with reference to the sequence listing part.

[51120] VGAM3654 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3654 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3654 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51121] VGAM3654 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3654 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3654 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3654 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3654 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51122] The complementary binding of VGAM3654 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3654 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3654 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3654 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51123] It is appreciated that VGAM3654 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3654 host target genes. The mRNA of each one of this plurality of VGAM3654 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3654 RNA, herein designated VGAM RNA, and which when bound by VGAM3654 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3654 host target proteins.

[51124] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3654 gene, herein designated VGAM GENE, on one or more VGAM3654 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51125] It is yet further appreciated that a function of VGAM3654 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3654 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3654 correlate with, and may be deduced

from, the identity of the host target genes which VGAM3654 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51126] Nucleotide sequences of the VGAM3654 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3654 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3654 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3654 are further described hereinbelow with reference to Table 1.

[51127] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3654 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51128] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3655 (VGAM3655) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51129] VGAM3655 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3655 was detected is described hereinabove with reference to Figs. 2–8.

[51130] VGAM3655 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3655 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51131] VGAM3655 gene, herein designated VGAM GENE, encodes a VGAM3655 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3655 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3655 precursor RNA is designated SEQ ID:82567, and is provided hereinbelow with reference to the sequence listing part.

[51132] VGAM3655 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3655 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51133] An enzyme complex designated DICER COMPLEX, dices the VGAM3655 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3655 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3655 RNA is designated SEQ ID:82568, and is provided hereinbelow with reference to the sequence listing part.

[51134] VGAM3655 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3655 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3655 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51135] VGAM3655 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3655 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3655 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3655 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3655 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51136] The complementary binding of VGAM3655 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3655 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3655 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3655 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51137] It is appreciated that VGAM3655 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3655 host target genes. The mRNA of each one of this plurality of VGAM3655 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3655 RNA, herein designated VGAM RNA, and which when bound by VGAM3655 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3655 host target proteins.

[51138] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3655 gene, herein designated VGAM GENE, on one or more VGAM3655 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51139] It is yet further appreciated that a function of VGAM3655 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3655 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3655 correlate with, and may be deduced from, the identity of the host target genes which VGAM3655

binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51140] Nucleotide sequences of the VGAM3655 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3655 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3655 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3655 are further described hereinbelow with reference to Table 1.

[51141] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3655 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51142] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3656 (VGAM3656) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51143] VGAM3656 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3656 was detected is described hereinabove with reference to Figs. 2–8.

[51144] VGAM3656 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3656 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51145] VGAM3656 gene, herein designated VGAM GENE, encodes a VGAM3656 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3656 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3656 precursor RNA is designated SEQ ID:82574, and is provided hereinbelow with reference to the sequence listing part.

[51146] VGAM3656 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3656 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51147] An enzyme complex designated DICER COMPLEX, dices the VGAM3656 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3656 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3656 RNA is designated SEQ ID:82575, and is provided hereinbelow with reference to the sequence listing part.

[51148] VGAM3656 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3656 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3656 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51149] VGAM3656 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3656 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3656 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3656 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3656 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[51150] The complementary binding of VGAM3656 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3656 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3656 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3656 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51151] It is appreciated that VGAM3656 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3656 host target genes. The mRNA of each one of this plurality of VGAM3656 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3656 RNA, herein designated VGAM RNA, and which when bound by VGAM3656 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3656 host target proteins.

[51152] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3656 gene, herein designated VGAM GENE, on one or more VGAM3656 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51153] It is yet further appreciated that a function of VGAM3656 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3656 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3656 correlate with, and may be deduced from, the identity of the host target genes which VGAM3656 binds and inhibits, and the function of these host target genes, as elaborated

hereinbelow.

[51154] Nucleotide sequences of the VGAM3656 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3656 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3656 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3656 are further described hereinbelow with reference to Table 1.

[51155] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3656 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51156] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3657 (VGAM3657) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51157] VGAM3657 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3657 was detected is described hereinabove with reference to Figs. 2–8.

[51158] VGAM3657 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Swinepox virus.

VGAM3657 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51159] VGAM3657 gene, herein designated VGAM GENE, encodes a VGAM3657 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3657 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3657 precursor RNA is designated SEQ ID:82586, and is provided hereinbelow with reference to the sequence listing part.

[51160] VGAM3657 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3657 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51161] An enzyme complex designated DICER COMPLEX, dices the VGAM3657 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3657 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3657 RNA is designated SEQ ID:82587, and is provided hereinbelow with reference to the sequence listing part.

[51162] VGAM3657 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3657 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3657 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[51163] VGAM3657 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3657 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3657 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3657 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3657 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51164] The complementary binding of VGAM3657 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3657 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3657 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3657 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51165] It is appreciated that VGAM3657 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3657 host target genes. The mRNA of each one of this plurality of VGAM3657 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3657 RNA, herein designated VGAM RNA, and which when bound by VGAM3657 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3657 host target proteins.

[51166] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3657 gene, herein designated VGAM GENE, on one

or more VGAM3657 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51167] It is yet further appreciated that a function of VGAM3657 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3657 include diagnosis, prevention and treatment of viral infection by Swinepox virus. Specific functions, and accordingly utilities, of VGAM3657 correlate with, and may be deduced from, the identity of the host target genes which VGAM3657 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51168] Nucleotide sequences of the VGAM3657 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3657 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3657 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3657 are further described hereinbelow with reference to Table 1.

[51169] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3657 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51170] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3658 (VGAM3658) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51171] VGAM3658 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3658 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[51172] VGAM3658 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Simian–Human immunodeficiency virus. VGAM3658 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51173] VGAM3658 gene, herein designated VGAM GENE, encodes a VGAM3658 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3658 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3658 precursor RNA is designated SEQ ID:82591, and is provided hereinbelow with reference to the sequence listing part.

[51174] VGAM3658 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3658 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51175] An enzyme complex designated DICER COMPLEX, dices the VGAM3658 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3658 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3658 RNA is designated SEQ ID:82592, and is provided hereinbelow with reference to the sequence listing part.

[51176] VGAM3658 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3658 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3658 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51177] VGAM3658 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3658 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3658 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3658 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3658 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51178] The complementary binding of VGAM3658 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3658 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3658 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3658 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51179] It is appreciated that VGAM3658 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3658 host target genes. The mRNA of each one of this plurality of VGAM3658 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3658 RNA, herein designated VGAM RNA, and which when bound by VGAM3658 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3658 host target proteins.

[51180] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3658 gene, herein designated VGAM GENE, on one or more VGAM3658 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51181] It is yet further appreciated that a function of VGAM3658 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3658 include diagnosis, prevention and treatment of viral infection by Simian-Human immunodeficiency virus. Specific functions, and accordingly utilities, of VGAM3658 correlate with, and may be deduced from, the identity of the host target genes which VGAM3658 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51182] Nucleotide sequences of the VGAM3658 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3658 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3658 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3658 are further described hereinbelow with reference to Table 1.

[51183] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3658 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51184] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3659 (VGAM3659) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51185] VGAM3659 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3659 was detected is described hereinabove with reference to Figs. 2-8.

[51186] VGAM3659 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3659 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51187] VGAM3659 gene, herein designated VGAM GENE, encodes a VGAM3659 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3659 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3659 precursor RNA is designated SEQ ID:82760, and is provided hereinbelow with reference to the sequence listing part.

[51188] VGAM3659 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3659 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[51189] An enzyme complex designated DICER COMPLEX, dices the VGAM3659 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3659 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3659 RNA is designated SEQ ID:82761, and is provided hereinbelow with reference to the sequence listing part.

[51190] VGAM3659 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3659 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3659 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51191] VGAM3659 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3659 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3659 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3659 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3659 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51192] The complementary binding of VGAM3659 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3659 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3659 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3659 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51193] It is appreciated that VGAM3659 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3659 host target genes. The mRNA of each one of this plurality of VGAM3659 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3659 RNA, herein designated VGAM RNA, and which when bound by VGAM3659 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3659 host target proteins.

[51194] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3659 gene, herein designated VGAM GENE, on one or more VGAM3659 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51195] It is yet further appreciated that a function of VGAM3659 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3659 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3659 correlate with, and may be deduced from, the identity of the host target genes which VGAM3659 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51196] Nucleotide sequences of the VGAM3659 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3659 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3659 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3659 are further described hereinbelow with reference to Table 1.

[51197] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3659 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51198] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3660 (VGAM3660) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51199] VGAM3660 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3660 was detected is described hereinabove with reference to Figs. 2-8.

[51200] VGAM3660 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Human herpesvirus 7. VGAM3660 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51201] VGAM3660 gene, herein designated VGAM GENE, encodes a VGAM3660 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3660 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3660 precursor RNA is designated SEQ ID:82765, and is provided hereinbelow with reference to the sequence listing part.

[51202] VGAM3660 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3660 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51203] An enzyme complex designated DICER COMPLEX, dices the VGAM3660 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3660 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3660 RNA is designated SEQ ID:82766, and is provided hereinbelow with reference to the sequence listing part.

[51204] VGAM3660 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3660 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3660 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51205] VGAM3660 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3660 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3660 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3660 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3660 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51206] The complementary binding of VGAM3660 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3660 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3660 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3660 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51207] It is appreciated that VGAM3660 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3660 host target genes. The mRNA of each one of this plurality of VGAM3660 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3660 RNA, herein designated VGAM RNA, and which when bound by VGAM3660 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3660 host target proteins.

[51208] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3660 gene, herein designated VGAM GENE, on one or more VGAM3660 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51209] It is yet further appreciated that a function of VGAM3660 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3660 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3660 correlate with, and may be deduced from, the identity of the host target genes which VGAM3660 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51210] Nucleotide sequences of the VGAM3660 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3660 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3660 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3660 are further described hereinbelow with reference to Table 1.

[51211] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3660 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51212] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3661 (VGAM3661) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51213] VGAM3661 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3661 was detected is described hereinabove with reference to Figs. 2-8.

[51214] VGAM3661 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 7.

VGAM3661 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51215] VGAM3661 gene, herein designated VGAM GENE, encodes a VGAM3661 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3661 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3661 precursor RNA is designated SEQ ID:82770, and is provided hereinbelow with reference to the sequence listing part.

[51216] VGAM3661 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3661 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51217] An enzyme complex designated DICER COMPLEX, dices

the VGAM3661 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3661 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3661 RNA is designated SEQ ID:82771, and is provided hereinbelow with reference to the sequence listing part.

[51218] VGAM3661 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3661 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3661 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51219] VGAM3661 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3661 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3661 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3661 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3661 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51220] The complementary binding of VGAM3661 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3661 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3661 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3661 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51221] It is appreciated that VGAM3661 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3661 host target genes. The mRNA of each one of this plurality of VGAM3661 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3661 RNA, herein designated VGAM RNA, and which when bound by VGAM3661 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3661 host target proteins.

[51222] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3661 gene, herein designated VGAM GENE, on one or more VGAM3661 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51223] It is yet further appreciated that a function of VGAM3661 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3661 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3661 correlate with, and may be deduced from, the identity of the host target genes which VGAM3661 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51224] Nucleotide sequences of the VGAM3661 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3661 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3661 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3661 are further described hereinbelow with reference to Table 1.

[51225] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3661 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51226] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3662 (VGAM3662) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51227] VGAM3662 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3662 was detected is described hereinabove with reference to Figs. 2-8.

[51228] VGAM3662 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6. VGAM3662 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[51229] VGAM3662 gene, herein designated VGAM GENE, encodes a VGAM3662 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3662 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3662 precursor RNA is designated SEQ ID:82773, and is provided hereinbelow with reference to the sequence listing part.

[51230] VGAM3662 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3662 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51231] An enzyme complex designated DICER COMPLEX, dices the VGAM3662 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3662 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3662 RNA is designated SEQ ID:82774, and is provided hereinbelow with reference to the sequence listing part.

[51232] VGAM3662 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3662 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3662 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51233] VGAM3662 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3662 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3662 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3662 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3662 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51234] The complementary binding of VGAM3662 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3662 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3662

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3662 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51235] It is appreciated that VGAM3662 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3662 host target genes. The mRNA of each one of this plurality of VGAM3662 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3662 RNA, herein designated VGAM RNA, and which when bound by VGAM3662 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3662 host target proteins.

[51236] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3662 gene, herein designated VGAM GENE, on one or more VGAM3662 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51237] It is yet further appreciated that a function of VGAM3662 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3662 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6. Specific functions, and accordingly utilities, of VGAM3662 correlate with, and may be deduced from, the identity of the host target genes which VGAM3662 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51238] Nucleotide sequences of the VGAM3662 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3662 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3662 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3662 are further described hereinbelow with reference to Table 1.

[51239] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3662 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51240] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3663 (VGAM3663) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51241] VGAM3663 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3663 was detected is described hereinabove with reference to Figs. 2-8.

[51242] VGAM3663 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice grassy stunt virus. VGAM3663 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[51243] VGAM3663 gene, herein designated VGAM GENE, encodes a VGAM3663 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3663 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3663 precursor RNA is designated SEQ ID:82806, and is provided hereinbelow with reference to the sequence listing part.

[51244] VGAM3663 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3663 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51245] An enzyme complex designated DICER COMPLEX, dices the VGAM3663 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3663 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3663 RNA is designated SEQ ID:82807, and is provided hereinbelow with reference to the sequence listing part.

[51246] VGAM3663 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3663 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3663 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51247] VGAM3663 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3663 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3663 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3663 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3663 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51248] The complementary binding of VGAM3663 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3663 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3663 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3663 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51249] It is appreciated that VGAM3663 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3663 host target genes. The mRNA of each one of this plurality of VGAM3663 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3663 RNA, herein designated VGAM RNA, and which when bound by VGAM3663 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3663 host target proteins.

[51250] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3663 gene, herein designated VGAM GENE, on one or more VGAM3663 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51251] It is yet further appreciated that a function of VGAM3663 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3663 include diagnosis, prevention and treatment of viral infection by Rice grassy stunt virus. Specific functions, and accordingly utilities, of VGAM3663 correlate with, and may be deduced from, the identity of the host target genes which VGAM3663 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51252] Nucleotide sequences of the VGAM3663 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3663 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3663 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3663 are further

described hereinbelow with reference to Table 1.

[51253] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3663 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51254] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3664 (VGAM3664) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51255] VGAM3664 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3664 was detected is described hereinabove with reference to Figs. 2-8.

[51256] VGAM3664 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Strawberry mild yellow edge virus. VGAM3664 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51257] VGAM3664 gene, herein designated VGAM GENE, encodes a VGAM3664 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3664 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3664 precursor RNA is designated SEQ ID:82821, and is provided hereinbelow with reference to the sequence listing part.

[51258] VGAM3664 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3664 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51259] An enzyme complex designated DICER COMPLEX, dices the VGAM3664 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3664 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3664 RNA is designated SEQ ID:82822, and is provided hereinbelow with reference to the sequence listing part.

[51260] VGAM3664 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3664 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3664 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51261] VGAM3664 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3664 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3664 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3664 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3664 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51262] The complementary binding of VGAM3664 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3664 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3664 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3664 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51263] It is appreciated that VGAM3664 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3664 host target genes. The mRNA of each one of this plurality of VGAM3664 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3664 RNA, herein designated VGAM RNA, and which when bound by VGAM3664 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3664 host target proteins.

[51264] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3664 gene, herein designated VGAM GENE, on one or more VGAM3664 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51265] It is yet further appreciated that a function of VGAM3664 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3664 include diagnosis, prevention and treatment of viral infection by Strawberry mild yellow edge virus. Specific functions, and accordingly utilities, of VGAM3664 correlate with, and may be deduced from, the identity of the host target genes which VGAM3664 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51266] Nucleotide sequences of the VGAM3664 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3664 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3664 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3664 are further described hereinbelow with reference to Table 1.

[51267] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3664 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51268] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3665 (VGAM3665) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51269] VGAM3665 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3665 was detected is described hereinabove with reference to Figs. 2-8.

[51270] VGAM3665 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3. VGAM3665 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51271] VGAM3665 gene, herein designated VGAM GENE, encodes

a VGAM3665 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3665 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3665 precursor RNA is designated SEQ ID:82826, and is provided hereinbelow with reference to the sequence listing part.

[51272] VGAM3665 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3665 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51273] An enzyme complex designated DICER COMPLEX, dices the VGAM3665 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3665 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3665 RNA is designated SEQ ID:82827, and is provided hereinbelow with reference to the sequence listing part.

[51274] VGAM3665 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3665 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3665 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51275] VGAM3665 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3665 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3665 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3665 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3665 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51276] The complementary binding of VGAM3665 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3665 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3665 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3665 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[51277] It is appreciated that VGAM3665 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3665 host target genes. The mRNA of each one of this plurality of VGAM3665 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3665 RNA, herein designated VGAM RNA, and which when bound by VGAM3665 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3665 host target proteins.

[51278] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3665 gene, herein designated VGAM GENE, on one or more VGAM3665 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51279] It is yet further appreciated that a function of VGAM3665 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3665 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3665 correlate with, and may be deduced from, the identity of the host target genes which VGAM3665 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51280] Nucleotide sequences of the VGAM3665 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3665 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3665 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3665 are further described hereinbelow with reference to Table 1.

[51281] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3665 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51282] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3666 (VGAM3666) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51283] VGAM3666 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3666 was detected is described hereinabove with reference to Figs. 2-8.

[51284] VGAM3666 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3666 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51285] VGAM3666 gene, herein designated VGAM GENE, encodes a VGAM3666 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3666 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3666 precursor RNA is designated SEQ ID:82839, and is provided hereinbelow with reference to the sequence listing part.

[51286] VGAM3666 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3666 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51287] An enzyme complex designated DICER COMPLEX, dices the VGAM3666 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3666 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3666 RNA is designated SEQ ID:82840, and is provided hereinbelow with reference to the sequence listing part.

[51288] VGAM3666 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3666 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3666 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51289] VGAM3666 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3666 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3666 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3666 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3666 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51290] The complementary binding of VGAM3666 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3666 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3666 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3666 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51291] It is appreciated that VGAM3666 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3666 host target genes. The mRNA of each one of this plurality of VGAM3666 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3666 RNA, herein designated VGAM RNA, and which when bound by VGAM3666 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3666 host target proteins.

[51292] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3666 gene, herein designated VGAM GENE, on one or more VGAM3666 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51293] It is yet further appreciated that a function of VGAM3666 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3666 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3666 correlate with, and may be deduced from, the identity of the host target genes which VGAM3666 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51294] Nucleotide sequences of the VGAM3666 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3666 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3666 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3666 are further described hereinbelow with reference to Table 1.

[51295] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3666 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51296] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3667 (VGAM3667) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51297] VGAM3667 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3667 was detected is described hereinabove with reference to Figs. 2-8.

[51298] VGAM3667 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3667 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51299] VGAM3667 gene, herein designated VGAM GENE, encodes a VGAM3667 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3667 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3667 precursor RNA is designated SEQ ID:82884, and is provided hereinbelow with reference to the sequence listing part.

[51300] VGAM3667 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3667 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51301] An enzyme complex designated DICER COMPLEX, dices the VGAM3667 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3667 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3667 RNA is designated SEQ ID:82885, and is provided hereinbelow with reference to the sequence listing part.

[51302] VGAM3667 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3667 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3667 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51303] VGAM3667 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3667 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3667 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3667 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3667 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51304] The complementary binding of VGAM3667 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3667 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3667 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3667 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51305] It is appreciated that VGAM3667 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3667 host target genes. The mRNA of each one of this plurality of VGAM3667 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3667 RNA, herein designated VGAM RNA, and which when bound by VGAM3667 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3667 host target proteins.

[51306] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3667 gene, herein designated VGAM GENE, on one or more VGAM3667 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51307] It is yet further appreciated that a function of VGAM3667 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3667 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3667 correlate with, and may be deduced from, the identity of the host target genes which VGAM3667 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51308] Nucleotide sequences of the VGAM3667 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3667 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3667 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3667 are further described hereinbelow with reference to Table 1.

[51309] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3667 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51310] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3668 (VGAM3668) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51311] VGAM3668 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3668 was detected is described hereinabove with reference to Figs. 2–8.

[51312] VGAM3668 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine rhinovirus 3. VGAM3668 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51313] VGAM3668 gene, herein designated VGAM GENE, encodes a VGAM3668 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3668 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3668 precursor RNA is designated SEQ ID:82896, and is provided hereinbelow with reference to the sequence listing part.

[51314] VGAM3668 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3668 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51315] An enzyme complex designated DICER COMPLEX, dices the VGAM3668 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3668 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3668 RNA is designated SEQ ID:82897, and is provided hereinbelow with reference to the sequence listing part.

[51316] VGAM3668 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3668 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3668 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51317] VGAM3668 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3668 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3668 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3668 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3668 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51318] The complementary binding of VGAM3668 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3668 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3668 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3668 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51319] It is appreciated that VGAM3668 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3668 host target genes. The mRNA of each one of this plurality of VGAM3668 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3668 RNA, herein designated VGAM RNA, and which when bound by VGAM3668 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3668 host target proteins.

[51320] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3668 gene, herein designated VGAM GENE, on one or more VGAM3668 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [51321] It is yet further appreciated that a function of VGAM3668 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3668 include diagnosis, prevention and treatment of viral infection by Equine rhinovirus 3. Specific functions, and accordingly utilities, of VGAM3668 correlate with, and may be deduced from, the identity of the host target genes which VGAM3668 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [51322] Nucleotide sequences of the VGAM3668 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3668 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3668 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3668 are further described hereinbelow with reference to Table 1.
- [51323] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3668 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51324] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3669 (VGAM3669) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51325] VGAM3669 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3669 was detected is described hereinabove with reference to Figs. 2–8.

[51326] VGAM3669 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus.

VGAM3669 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51327] VGAM3669 gene, herein designated VGAM GENE, encodes a VGAM3669 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3669 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3669 precursor RNA is designated SEQ ID:83006, and is provided hereinbelow with reference to the sequence listing part.

[51328] VGAM3669 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3669 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51329] An enzyme complex designated DICER COMPLEX, dices the VGAM3669 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3669 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3669 RNA is designated SEQ ID:83007, and is provided hereinbelow with reference to the sequence listing part.

[51330] VGAM3669 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3669 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3669 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51331] VGAM3669 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3669 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3669 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3669 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3669 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51332] The complementary binding of VGAM3669 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3669 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3669 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3669 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51333] It is appreciated that VGAM3669 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3669 host target genes. The mRNA of

each one of this plurality of VGAM3669 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3669 RNA, herein designated VGAM RNA, and which when bound by VGAM3669 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3669 host target proteins.

[51334] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3669 gene, herein designated VGAM GENE, on one or more VGAM3669 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[51335] It is yet further appreciated that a function of VGAM3669 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3669 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3669 correlate with, and may be deduced from, the identity of the host target genes which VGAM3669 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51336] Nucleotide sequences of the VGAM3669 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3669 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3669 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3669 are further described hereinbelow with reference to Table 1.

[51337] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3669 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[51338] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3670 (VGAM3670) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51339] VGAM3670 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3670 was detected is described hereinabove with reference to Figs. 2–8.

[51340] VGAM3670 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus.

VGAM3670 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51341] VGAM3670 gene, herein designated VGAM GENE, encodes a VGAM3670 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3670 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3670 precursor RNA is designated SEQ ID:83026, and is provided hereinbelow with reference to the sequence listing part.

[51342] VGAM3670 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3670 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51343] An enzyme complex designated DICER COMPLEX, dices the VGAM3670 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3670 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3670 RNA is designated SEQ ID:83027,

and is provided hereinbelow with reference to the sequence listing part.

[51344] VGAM3670 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3670 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3670 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51345] VGAM3670 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3670 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3670 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3670 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3670 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51346] The complementary binding of VGAM3670 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3670 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3670 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3670 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51347] It is appreciated that VGAM3670 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3670 host target genes. The mRNA of each one of this plurality of VGAM3670 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3670 RNA, herein designated VGAM RNA, and which when bound by VGAM3670 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3670 host target proteins.

[51348] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3670 gene, herein designated VGAM GENE, on one or more VGAM3670 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51349] It is yet further appreciated that a function of VGAM3670 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3670 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3670 correlate with, and may be deduced from, the identity of the host target genes which VGAM3670 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51350] Nucleotide sequences of the VGAM3670 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3670 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3670 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3670 are further described hereinbelow with reference to Table 1.

[51351] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3670 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51352] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3671 (VGAM3671) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51353] VGAM3671 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3671 was detected is described hereinabove with reference to Figs. 2–8.

[51354] VGAM3671 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Swinepox virus. VGAM3671 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51355] VGAM3671 gene, herein designated VGAM GENE, encodes a VGAM3671 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3671 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3671 precu-

sor RNA is designated SEQ ID:83053, and is provided hereinbelow with reference to the sequence listing part.

[51356] VGAM3671 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3671 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51357] An enzyme complex designated DICER COMPLEX, dices the VGAM3671 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3671 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3671 RNA is designated SEQ ID:83054, and is provided hereinbelow with reference to the se-

quence listing part.

[51358] VGAM3671 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3671 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3671 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51359] VGAM3671 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3671 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3671 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3671 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3671 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51360] The complementary binding of VGAM3671 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3671 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3671 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3671 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51361] It is appreciated that VGAM3671 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3671 host target genes. The mRNA of each one of this plurality of VGAM3671 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3671 RNA, herein designated VGAM RNA, and which when bound by VGAM3671 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3671 host target proteins.

[51362] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3671 gene, herein designated VGAM GENE, on one or more VGAM3671 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51363] It is yet further appreciated that a function of VGAM3671

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3671 include diagnosis, prevention and treatment of viral infection by Swinepox virus. Specific functions, and accordingly utilities, of VGAM3671 correlate with, and may be deduced from, the identity of the host target genes which VGAM3671 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51364] Nucleotide sequences of the VGAM3671 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3671 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3671 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3671 are further described hereinbelow with reference to Table 1.

[51365] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3671 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51366] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3672 (VGAM3672) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51367] VGAM3672 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3672 was detected is described hereinabove with reference to Figs. 2–8.

[51368] VGAM3672 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3672 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51369] VGAM3672 gene, herein designated VGAM GENE, encodes a VGAM3672 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3672 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3672 precursor RNA is designated SEQ ID:83062, and is provided

hereinbelow with reference to the sequence listing part.

[51370] VGAM3672 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3672 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51371] An enzyme complex designated DICER COMPLEX, dices the VGAM3672 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3672 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3672 RNA is designated SEQ ID:83063, and is provided hereinbelow with reference to the sequence listing part.

[51372] VGAM3672 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3672 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3672 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51373] VGAM3672 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3672 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3672 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3672 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3672 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51374] The complementary binding of VGAM3672 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3672 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3672 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3672 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51375] It is appreciated that VGAM3672 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3672 host target genes. The mRNA of each one of this plurality of VGAM3672 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3672 RNA, herein designated VGAM RNA, and which when bound by VGAM3672 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3672 host target proteins.

[51376] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3672 gene, herein designated VGAM GENE, on one or more VGAM3672 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51377] It is yet further appreciated that a function of VGAM3672 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3672 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3672 correlate with, and may be deduced from, the identity of the host target genes which VGAM3672 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51378] Nucleotide sequences of the VGAM3672 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3672 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3672 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3672 are further described hereinbelow with reference to Table 1.

[51379] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3672 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51380] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3673 (VGAM3673) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51381] VGAM3673 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3673 was detected is described hereinabove with reference to Figs. 2–8.

[51382] VGAM3673 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3673 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51383] VGAM3673 gene, herein designated VGAM GENE, encodes a VGAM3673 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3673 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3673 precursor RNA is designated SEQ ID:83090, and is provided hereinbelow with reference to the sequence listing part.

[51384] VGAM3673 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3673 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51385] An enzyme complex designated DICER COMPLEX, dices the VGAM3673 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3673 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3673 RNA is designated SEQ ID:83091, and is provided hereinbelow with reference to the sequence listing part.

[51386] VGAM3673 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3673 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3673 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51387] VGAM3673 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3673 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3673 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3673 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3673 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51388] The complementary binding of VGAM3673 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3673 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3673 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3673 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51389] It is appreciated that VGAM3673 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3673 host target genes. The mRNA of each one of this plurality of VGAM3673 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3673 RNA, herein designated VGAM

RNA, and which when bound by VGAM3673 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3673 host target proteins.

[51390] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3673 gene, herein designated VGAM GENE, on one or more VGAM3673 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51391] It is yet further appreciated that a function of VGAM3673 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3673 include diagnosis, prevention and treatment of viral infection by *Melanoplus sanguinipes* entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3673 correlate with, and may be deduced from, the identity of the host target genes which VGAM3673 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51392] Nucleotide sequences of the VGAM3673 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3673 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3673 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3673 are further described hereinbelow with reference to Table 1.

[51393] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3673 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51394] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3674 (VGAM3674) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51395] VGAM3674 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3674 was detected is described hereinabove with reference to Figs. 2-8.

[51396] VGAM3674 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Macaca mulatta rhadinovirus. VGAM3674 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51397] VGAM3674 gene, herein designated VGAM GENE, encodes a VGAM3674 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3674 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3674 precursor RNA is designated SEQ ID:83095, and is provided hereinbelow with reference to the sequence listing part.

[51398] VGAM3674 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3674 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51399] An enzyme complex designated DICER COMPLEX, dices the VGAM3674 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3674 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3674 RNA is designated SEQ ID:83096, and is provided hereinbelow with reference to the sequence listing part.

[51400] VGAM3674 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3674 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3674 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51401] VGAM3674 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3674 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3674 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3674 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3674 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51402] The complementary binding of VGAM3674 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3674 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3674 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3674 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51403] It is appreciated that VGAM3674 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3674 host target genes. The mRNA of each one of this plurality of VGAM3674 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3674 RNA, herein designated VGAM RNA, and which when bound by VGAM3674 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3674 host target proteins.

[51404] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3674 gene, herein designated VGAM GENE, on one or more VGAM3674 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51405] It is yet further appreciated that a function of VGAM3674 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3674 include diagnosis, prevention and

treatment of viral infection by *Macaca mulatta* rhadinovirus. Specific functions, and accordingly utilities, of VGAM3674 correlate with, and may be deduced from, the identity of the host target genes which VGAM3674 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51406] Nucleotide sequences of the VGAM3674 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3674 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3674 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3674 are further described hereinbelow with reference to Table 1.

[51407] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3674 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51408] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3675 (VGAM3675) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51409] VGAM3675 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3675 was detected is described hereinabove with reference to Figs. 2–8.

[51410] VGAM3675 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pea seed-borne mosaic virus. VGAM3675 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51411] VGAM3675 gene, herein designated VGAM GENE, encodes a VGAM3675 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3675 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3675 precursor RNA is designated SEQ ID:83215, and is provided hereinbelow with reference to the sequence listing part.

[51412] VGAM3675 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3675 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51413] An enzyme complex designated DICER COMPLEX, dices the VGAM3675 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3675 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3675 RNA is designated SEQ ID:83216, and is provided hereinbelow with reference to the sequence listing part.

[51414] VGAM3675 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3675 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3675 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51415] VGAM3675 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3675 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3675 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3675 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3675 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51416] The complementary binding of VGAM3675 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3675 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3675 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3675 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51417] It is appreciated that VGAM3675 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3675 host target genes. The mRNA of each one of this plurality of VGAM3675 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3675 RNA, herein designated VGAM RNA, and which when bound by VGAM3675 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3675 host target proteins.

[51418] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3675 gene, herein designated VGAM GENE, on one or more VGAM3675 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51419] It is yet further appreciated that a function of VGAM3675 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3675 include diagnosis, prevention and treatment of viral infection by Pea seed-borne mosaic

virus. Specific functions, and accordingly utilities, of VGAM3675 correlate with, and may be deduced from, the identity of the host target genes which VGAM3675 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51420] Nucleotide sequences of the VGAM3675 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3675 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3675 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3675 are further described hereinbelow with reference to Table 1.

[51421] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3675 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51422] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3676 (VGAM3676) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[51423] VGAM3676 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3676 was detected is described hereinabove with reference to Figs. 2–8.

[51424] VGAM3676 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Satellite virus of maize white line mosaic virus. VGAM3676 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51425] VGAM3676 gene, herein designated VGAM GENE, encodes a VGAM3676 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3676 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3676 precursor RNA is designated SEQ ID:83224, and is provided hereinbelow with reference to the sequence listing part.

[51426] VGAM3676 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3676 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51427] An enzyme complex designated DICER COMPLEX, dices the VGAM3676 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3676 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3676 RNA is designated SEQ ID:83225, and is provided hereinbelow with reference to the sequence listing part.

[51428] VGAM3676 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3676 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3676 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51429] VGAM3676 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3676 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3676 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3676 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3676 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51430] The complementary binding of VGAM3676 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3676 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3676 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3676 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51431] It is appreciated that VGAM3676 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3676 host target genes. The mRNA of each one of this plurality of VGAM3676 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3676 RNA, herein designated VGAM RNA, and which when bound by VGAM3676 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3676 host target proteins.

[51432] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3676 gene, herein designated VGAM GENE, on one or more VGAM3676 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51433] It is yet further appreciated that a function of VGAM3676 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3676 include diagnosis, prevention and treatment of viral infection by Satellite virus of maize white line mosaic virus. Specific functions, and accord-

ingly utilities, of VGAM3676 correlate with, and may be deduced from, the identity of the host target genes which VGAM3676 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51434] Nucleotide sequences of the VGAM3676 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3676 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3676 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3676 are further described hereinbelow with reference to Table 1.

[51435] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3676 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51436] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3677 (VGAM3677) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[51437] VGAM3677 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3677 was detected is described hereinabove with reference to Figs. 2–8.

[51438] VGAM3677 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 2. VGAM3677 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51439] VGAM3677 gene, herein designated VGAM GENE, encodes a VGAM3677 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3677 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3677 precursor RNA is designated SEQ ID:83231, and is provided hereinbelow with reference to the sequence listing part.

[51440] VGAM3677 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3677 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51441] An enzyme complex designated DICER COMPLEX, dices the VGAM3677 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3677 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3677 RNA is designated SEQ ID:83232, and is provided hereinbelow with reference to the sequence listing part.

[51442] VGAM3677 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3677 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3677 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51443] VGAM3677 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3677 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3677 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3677 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3677 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51444] The complementary binding of VGAM3677 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3677 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3677 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3677 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51445] It is appreciated that VGAM3677 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3677 host target genes. The mRNA of each one of this plurality of VGAM3677 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3677 RNA, herein designated VGAM RNA, and which when bound by VGAM3677 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3677 host target proteins.

[51446] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3677 gene, herein designated VGAM GENE, on one or more VGAM3677 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51447] It is yet further appreciated that a function of VGAM3677 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3677 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3677 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3677 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51448] Nucleotide sequences of the VGAM3677 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3677 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3677 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3677 are further described hereinbelow with reference to Table 1.

[51449] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3677 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51450] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3678 (VGAM3678) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51451] VGAM3678 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3678 was detected is described hereinabove with reference to Figs. 2–8.

[51452] VGAM3678 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3678 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51453] VGAM3678 gene, herein designated VGAM GENE, encodes a VGAM3678 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3678 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3678 precursor RNA is designated SEQ ID:83253, and is provided hereinbelow with reference to the sequence listing part.

[51454] VGAM3678 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3678 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51455] An enzyme complex designated DICER COMPLEX, dices the VGAM3678 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3678 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3678 RNA is designated SEQ ID:83254, and is provided hereinbelow with reference to the sequence listing part.

[51456] VGAM3678 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3678 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3678 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51457] VGAM3678 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3678 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3678 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3678 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3678 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51458] The complementary binding of VGAM3678 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3678 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3678 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3678 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51459] It is appreciated that VGAM3678 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3678 host target genes. The mRNA of each one of this plurality of VGAM3678 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3678 RNA, herein designated VGAM RNA, and which when bound by VGAM3678 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3678 host target proteins.

[51460] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3678 gene, herein designated VGAM GENE, on one or more VGAM3678 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51461] It is yet further appreciated that a function of VGAM3678 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3678 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3678 correlate with, and may be deduced from, the identity of the host target genes which VGAM3678 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[51462] Nucleotide sequences of the VGAM3678 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3678 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3678 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3678 are further described hereinbelow with reference to Table 1.

[51463] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3678 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51464] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3679 (VGAM3679) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51465] VGAM3679 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3679 was detected is described hereinabove with reference to Figs. 2–8.

[51466] VGAM3679 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3679 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51467] VGAM3679 gene, herein designated VGAM GENE, encodes a VGAM3679 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3679 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3679 precursor RNA is designated SEQ ID:83259, and is provided hereinbelow with reference to the sequence listing part.

[51468] VGAM3679 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3679 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51469] An enzyme complex designated DICER COMPLEX, dices the VGAM3679 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3679 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3679 RNA is designated SEQ ID:83260, and is provided hereinbelow with reference to the sequence listing part.

[51470] VGAM3679 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3679 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3679 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51471] VGAM3679 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3679 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3679 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3679 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3679 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[51472] The complementary binding of VGAM3679 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3679 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3679 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3679 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51473] It is appreciated that VGAM3679 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3679 host target genes. The mRNA of each one of this plurality of VGAM3679 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3679 RNA, herein designated VGAM RNA, and which when bound by VGAM3679 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3679 host target proteins.

[51474] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3679 gene, herein designated VGAM GENE, on one or more VGAM3679 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51475] It is yet further appreciated that a function of VGAM3679 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3679 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3679 correlate with, and may be deduced from, the identity of the host target genes which VGAM3679 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[51476] Nucleotide sequences of the VGAM3679 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3679 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3679 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3679 are further described hereinbelow with reference to Table 1.

[51477] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3679 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51478] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3680 (VGAM3680) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51479] VGAM3680 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3680 was detected is described hereinabove with reference to Figs. 2–8.

[51480] VGAM3680 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus.

VGAM3680 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51481] VGAM3680 gene, herein designated VGAM GENE, encodes a VGAM3680 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3680 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3680 precursor RNA is designated SEQ ID:83263, and is provided hereinbelow with reference to the sequence listing part.

[51482] VGAM3680 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3680 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51483] An enzyme complex designated DICER COMPLEX, dices the VGAM3680 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3680 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3680 RNA is designated SEQ ID:83264, and is provided hereinbelow with reference to the sequence listing part.

[51484] VGAM3680 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3680 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3680 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[51485] VGAM3680 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3680 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3680 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3680 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3680 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51486] The complementary binding of VGAM3680 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3680 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3680 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3680 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51487] It is appreciated that VGAM3680 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3680 host target genes. The mRNA of each one of this plurality of VGAM3680 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3680 RNA, herein designated VGAM RNA, and which when bound by VGAM3680 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3680 host target proteins.

[51488] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3680 gene, herein designated VGAM GENE, on one

or more VGAM3680 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51489] It is yet further appreciated that a function of VGAM3680 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3680 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3680 correlate with, and may be deduced from, the identity of the host target genes which VGAM3680 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51490] Nucleotide sequences of the VGAM3680 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3680 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3680 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3680 are further described hereinbelow with reference to Table 1.

[51491] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3680 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51492] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3681 (VGAM3681) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51493] VGAM3681 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3681 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[51494] VGAM3681 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious spleen and kidney necrosis virus. VGAM3681 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51495] VGAM3681 gene, herein designated VGAM GENE, encodes a VGAM3681 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3681 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3681 precursor RNA is designated SEQ ID:83271, and is provided hereinbelow with reference to the sequence listing part.

[51496] VGAM3681 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3681 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51497] An enzyme complex designated DICER COMPLEX, dices the VGAM3681 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3681 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3681 RNA is designated SEQ ID:83272, and is provided hereinbelow with reference to the sequence listing part.

[51498] VGAM3681 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3681 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3681 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51499] VGAM3681 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3681 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3681 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3681 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3681 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51500] The complementary binding of VGAM3681 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3681 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3681 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3681 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51501] It is appreciated that VGAM3681 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3681 host target genes. The mRNA of each one of this plurality of VGAM3681 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3681 RNA, herein designated VGAM RNA, and which when bound by VGAM3681 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3681 host target proteins.

[51502] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3681 gene, herein designated VGAM GENE, on one or more VGAM3681 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51503] It is yet further appreciated that a function of VGAM3681 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3681 include diagnosis, prevention and treatment of viral infection by Infectious spleen and kidney necrosis virus. Specific functions, and accordingly utilities, of VGAM3681 correlate with, and may be deduced from, the identity of the host target genes which VGAM3681 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51504] Nucleotide sequences of the VGAM3681 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3681 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3681 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3681 are further described hereinbelow with reference to Table 1.

[51505] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3681 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51506] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3682 (VGAM3682) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51507] VGAM3682 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3682 was detected is described hereinabove with reference to Figs. 2-8.

[51508] VGAM3682 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious spleen and kidney necrosis virus. VGAM3682 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51509] VGAM3682 gene, herein designated VGAM GENE, encodes a VGAM3682 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3682 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3682 precursor RNA is designated SEQ ID:83296, and is provided hereinbelow with reference to the sequence listing part.

[51510] VGAM3682 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3682 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[51511] An enzyme complex designated DICER COMPLEX, dices the VGAM3682 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3682 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 80%) nucleotide sequence of VGAM3682 RNA is designated SEQ ID:83297, and is provided hereinbelow with reference to the sequence listing part.

[51512] VGAM3682 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3682 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3682 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51513] VGAM3682 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3682 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3682 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3682 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3682 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51514] The complementary binding of VGAM3682 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3682 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3682 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3682 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51515] It is appreciated that VGAM3682 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3682 host target genes. The mRNA of each one of this plurality of VGAM3682 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3682 RNA, herein designated VGAM RNA, and which when bound by VGAM3682 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3682 host target proteins.

[51516] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3682 gene, herein designated VGAM GENE, on one or more VGAM3682 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51517] It is yet further appreciated that a function of VGAM3682 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3682 include diagnosis, prevention and treatment of viral infection by Infectious spleen and kidney necrosis virus. Specific functions, and accordingly utilities, of VGAM3682 correlate with, and may be deduced from, the identity of the host target genes which VGAM3682 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51518] Nucleotide sequences of the VGAM3682 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3682 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3682 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3682 are further described hereinbelow with reference to Table 1.

[51519] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3682 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51520] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3683 (VGAM3683) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51521] VGAM3683 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3683 was detected is described hereinabove with reference to Figs. 2-8.

[51522] VGAM3683 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Planococcus citri denso-virus. VGAM3683 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51523] VGAM3683 gene, herein designated VGAM GENE, encodes a VGAM3683 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3683 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3683 precursor RNA is designated SEQ ID:83333, and is provided hereinbelow with reference to the sequence listing part.

[51524] VGAM3683 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3683 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51525] An enzyme complex designated DICER COMPLEX, dices the VGAM3683 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3683 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3683 RNA is designated SEQ ID:83334, and is provided hereinbelow with reference to the sequence listing part.

[51526] VGAM3683 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3683 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3683 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51527] VGAM3683 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3683 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3683 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3683 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3683 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51528] The complementary binding of VGAM3683 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3683 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3683 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3683 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51529] It is appreciated that VGAM3683 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3683 host target genes. The mRNA of each one of this plurality of VGAM3683 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3683 RNA, herein designated VGAM RNA, and which when bound by VGAM3683 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3683 host target proteins.

[51530] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3683 gene, herein designated VGAM GENE, on one or more VGAM3683 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51531] It is yet further appreciated that a function of VGAM3683 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3683 include diagnosis, prevention and treatment of viral infection by Planococcus citri densovirus. Specific functions, and accordingly utilities, of VGAM3683 correlate with, and may be deduced from, the identity of the host target genes which VGAM3683 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51532] Nucleotide sequences of the VGAM3683 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3683 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3683 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3683 are further described hereinbelow with reference to Table 1.

[51533] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3683 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51534] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3684 (VGAM3684) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51535] VGAM3684 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3684 was detected is described hereinabove with reference to Figs. 2-8.

[51536] VGAM3684 gene, herein designated VGAM GENE, is a viral gene contained in the genome of *Trichomonas vaginalis*

virus 3. VGAM3684 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51537] VGAM3684 gene, herein designated VGAM GENE, encodes a VGAM3684 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3684 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3684 precursor RNA is designated SEQ ID:83343, and is provided hereinbelow with reference to the sequence listing part.

[51538] VGAM3684 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3684 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51539] An enzyme complex designated DICER COMPLEX, dices

the VGAM3684 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3684 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3684 RNA is designated SEQ ID:83344, and is provided hereinbelow with reference to the sequence listing part.

[51540] VGAM3684 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3684 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3684 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51541] VGAM3684 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3684 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3684 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3684 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3684 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51542] The complementary binding of VGAM3684 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3684 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3684 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3684 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51543] It is appreciated that VGAM3684 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3684 host target genes. The mRNA of each one of this plurality of VGAM3684 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3684 RNA, herein designated VGAM RNA, and which when bound by VGAM3684 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3684 host target proteins.

[51544] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3684 gene, herein designated VGAM GENE, on one or more VGAM3684 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51545] It is yet further appreciated that a function of VGAM3684 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3684 include diagnosis, prevention and treatment of viral infection by Trichomonas vaginalis virus 3. Specific functions, and accordingly utilities, of VGAM3684 correlate with, and may be deduced from, the identity of the host target genes which VGAM3684 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51546] Nucleotide sequences of the VGAM3684 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3684 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3684 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3684 are further described hereinbelow with reference to Table 1.

[51547] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3684 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51548] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3685 (VGAM3685) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51549] VGAM3685 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3685 was detected is described hereinabove with reference to Figs. 2-8.

[51550] VGAM3685 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Alcelaphine herpesvirus 1. VGAM3685 host target gene, herein designated VGAM

HOST TARGET GENE, is a human gene contained in the human genome.

[51551] VGAM3685 gene, herein designated VGAM GENE, encodes a VGAM3685 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3685 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3685 precursor RNA is designated SEQ ID:83355, and is provided hereinbelow with reference to the sequence listing part.

[51552] VGAM3685 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3685 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51553] An enzyme complex designated DICER COMPLEX, dices the VGAM3685 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3685 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3685 RNA is designated SEQ ID:83356, and is provided hereinbelow with reference to the sequence listing part.

[51554] VGAM3685 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3685 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3685 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51555] VGAM3685 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3685 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3685 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3685 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3685 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51556] The complementary binding of VGAM3685 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3685 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3685

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3685 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51557] It is appreciated that VGAM3685 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3685 host target genes. The mRNA of each one of this plurality of VGAM3685 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3685 RNA, herein designated VGAM RNA, and which when bound by VGAM3685 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3685 host target proteins.

[51558] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3685 gene, herein designated VGAM GENE, on one or more VGAM3685 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51559] It is yet further appreciated that a function of VGAM3685 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3685 include diagnosis, prevention and treatment of viral infection by Alcelaphine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3685 correlate with, and may be deduced from, the identity of the host target genes which VGAM3685 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51560] Nucleotide sequences of the VGAM3685 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3685 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3685 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3685 are further described hereinbelow with reference to Table 1.

[51561] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3685 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51562] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3686 (VGAM3686) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51563] VGAM3686 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3686 was detected is described hereinabove with reference to Figs. 2-8.

[51564] VGAM3686 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Variola virus. VGAM3686 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51565] VGAM3686 gene, herein designated VGAM GENE, encodes a VGAM3686 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3686 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3686 precursor RNA is designated SEQ ID:83360, and is provided hereinbelow with reference to the sequence listing part.

[51566] VGAM3686 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3686 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51567] An enzyme complex designated DICER COMPLEX, dices the VGAM3686 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3686 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3686 RNA is designated SEQ ID:83361, and is provided hereinbelow with reference to the sequence listing part.

[51568] VGAM3686 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3686 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3686 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51569] VGAM3686 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3686 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3686 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3686 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3686 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51570] The complementary binding of VGAM3686 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3686 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3686 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3686 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51571] It is appreciated that VGAM3686 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3686 host target genes. The mRNA of each one of this plurality of VGAM3686 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3686 RNA, herein designated VGAM RNA, and which when bound by VGAM3686 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3686 host target proteins.

[51572] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3686 gene, herein designated VGAM GENE, on one or more VGAM3686 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51573] It is yet further appreciated that a function of VGAM3686 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3686 include diagnosis, prevention and treatment of viral infection by Variola virus. Specific functions, and accordingly utilities, of VGAM3686 correlate with, and may be deduced from, the identity of the host target genes which VGAM3686 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51574] Nucleotide sequences of the VGAM3686 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3686 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3686 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3686 are further described hereinbelow with reference to Table 1.

[51575] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3686 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51576] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3687 (VGAM3687) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51577] VGAM3687 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3687 was detected is described hereinabove with reference to Figs. 2-8.

[51578] VGAM3687 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2. VGAM3687 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51579] VGAM3687 gene, herein designated VGAM GENE, encodes

a VGAM3687 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3687 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3687 precursor RNA is designated SEQ ID:83367, and is provided hereinbelow with reference to the sequence listing part.

[51580] VGAM3687 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3687 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51581] An enzyme complex designated DICER COMPLEX, dices the VGAM3687 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3687 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3687 RNA is designated SEQ ID:83368, and is provided hereinbelow with reference to the sequence listing part.

[51582] VGAM3687 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3687 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3687 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51583] VGAM3687 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3687 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3687 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3687 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3687 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51584] The complementary binding of VGAM3687 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3687 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3687 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3687 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[51585] It is appreciated that VGAM3687 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3687 host target genes. The mRNA of each one of this plurality of VGAM3687 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3687 RNA, herein designated VGAM RNA, and which when bound by VGAM3687 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3687 host target proteins.

[51586] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3687 gene, herein designated VGAM GENE, on one or more VGAM3687 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51587] It is yet further appreciated that a function of VGAM3687 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3687 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3687 correlate with, and may be deduced from, the identity of the host target genes which VGAM3687 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51588] Nucleotide sequences of the VGAM3687 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3687 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3687 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3687 are further described hereinbelow with reference to Table 1.

[51589] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3687 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51590] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3688 (VGAM3688) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51591] VGAM3688 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3688 was detected is described hereinabove with reference to Figs. 2-8.

[51592] VGAM3688 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious flacherie virus. VGAM3688 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51593] VGAM3688 gene, herein designated VGAM GENE, encodes a VGAM3688 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3688 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3688 precursor RNA is designated SEQ ID:83377, and is provided hereinbelow with reference to the sequence listing part.

[51594] VGAM3688 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3688 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51595] An enzyme complex designated DICER COMPLEX, dices the VGAM3688 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3688 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3688 RNA is designated SEQ ID:83378, and is provided hereinbelow with reference to the sequence listing part.

[51596] VGAM3688 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3688 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3688 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51597] VGAM3688 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3688 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3688 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3688 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3688 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51598] The complementary binding of VGAM3688 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3688 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3688 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3688 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51599] It is appreciated that VGAM3688 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3688 host target genes. The mRNA of each one of this plurality of VGAM3688 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3688 RNA, herein designated VGAM RNA, and which when bound by VGAM3688 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3688 host target proteins.

[51600] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3688 gene, herein designated VGAM GENE, on one or more VGAM3688 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51601] It is yet further appreciated that a function of VGAM3688 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3688 include diagnosis, prevention and treatment of viral infection by Infectious flacherie virus. Specific functions, and accordingly utilities, of VGAM3688 correlate with, and may be deduced from, the identity of the host target genes which VGAM3688 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51602] Nucleotide sequences of the VGAM3688 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3688 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3688 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3688 are further described hereinbelow with reference to Table 1.

[51603] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3688 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51604] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3689 (VGAM3689) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51605] VGAM3689 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3689 was detected is described hereinabove with reference to Figs. 2-8.

[51606] VGAM3689 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3689 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51607] VGAM3689 gene, herein designated VGAM GENE, encodes a VGAM3689 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3689 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3689 precursor RNA is designated SEQ ID:83385, and is provided hereinbelow with reference to the sequence listing part.

[51608] VGAM3689 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3689 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51609] An enzyme complex designated DICER COMPLEX, dices the VGAM3689 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3689 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3689 RNA is designated SEQ ID:83386, and is provided hereinbelow with reference to the sequence listing part.

[51610] VGAM3689 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3689 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3689 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51611] VGAM3689 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3689 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3689 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3689 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3689 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51612] The complementary binding of VGAM3689 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3689 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3689 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3689 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51613] It is appreciated that VGAM3689 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3689 host target genes. The mRNA of each one of this plurality of VGAM3689 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3689 RNA, herein designated VGAM RNA, and which when bound by VGAM3689 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3689 host target proteins.

[51614] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3689 gene, herein designated VGAM GENE, on one or more VGAM3689 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51615] It is yet further appreciated that a function of VGAM3689 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3689 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3689 correlate with, and may be deduced from, the identity of the host target genes which VGAM3689 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51616] Nucleotide sequences of the VGAM3689 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3689 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3689 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3689 are further described hereinbelow with reference to Table 1.

[51617] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3689 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51618] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3690 (VGAM3690) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51619] VGAM3690 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3690 was detected is described hereinabove with reference to Figs. 2–8.

[51620] VGAM3690 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Murid herpesvirus 4. VGAM3690 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51621] VGAM3690 gene, herein designated VGAM GENE, encodes a VGAM3690 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3690 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3690 precursor RNA is designated SEQ ID:83389, and is provided hereinbelow with reference to the sequence listing part.

[51622] VGAM3690 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3690 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51623] An enzyme complex designated DICER COMPLEX, dices the VGAM3690 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3690 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3690 RNA is designated SEQ ID:83390, and is provided hereinbelow with reference to the sequence listing part.

[51624] VGAM3690 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3690 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3690 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51625] VGAM3690 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3690 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3690 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3690 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3690 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51626] The complementary binding of VGAM3690 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3690 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3690 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3690 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51627] It is appreciated that VGAM3690 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3690 host target genes. The mRNA of each one of this plurality of VGAM3690 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3690 RNA, herein designated VGAM RNA, and which when bound by VGAM3690 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3690 host target proteins.

[51628] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3690 gene, herein designated VGAM GENE, on one or more VGAM3690 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [51629] It is yet further appreciated that a function of VGAM3690 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3690 include diagnosis, prevention and treatment of viral infection by Murid herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3690 correlate with, and may be deduced from, the identity of the host target genes which VGAM3690 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [51630] Nucleotide sequences of the VGAM3690 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3690 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3690 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3690 are further described hereinbelow with reference to Table 1.
- [51631] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3690 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51632] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3691 (VGAM3691) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51633] VGAM3691 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3691 was detected is described hereinabove with reference to Figs. 2-8.

[51634] VGAM3691 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Trichomonas vaginalis virus 3. VGAM3691 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51635] VGAM3691 gene, herein designated VGAM GENE, encodes a VGAM3691 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3691 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3691 precursor RNA is designated SEQ ID:83413, and is provided hereinbelow with reference to the sequence listing part.

[51636] VGAM3691 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3691 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51637] An enzyme complex designated DICER COMPLEX, dices the VGAM3691 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3691 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3691 RNA is designated SEQ ID:83414, and is provided hereinbelow with reference to the sequence listing part.

[51638] VGAM3691 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3691 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3691 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51639] VGAM3691 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3691 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3691 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3691 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3691 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51640] The complementary binding of VGAM3691 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3691 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3691 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3691 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51641] It is appreciated that VGAM3691 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3691 host target genes. The mRNA of

each one of this plurality of VGAM3691 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3691 RNA, herein designated VGAM RNA, and which when bound by VGAM3691 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3691 host target proteins.

[51642] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3691 gene, herein designated VGAM GENE, on one or more VGAM3691 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[51643] It is yet further appreciated that a function of VGAM3691 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3691 include diagnosis, prevention and treatment of viral infection by *Trichomonas vaginalis* virus 3. Specific functions, and accordingly utilities, of VGAM3691 correlate with, and may be deduced from, the identity of the host target genes which VGAM3691 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51644] Nucleotide sequences of the VGAM3691 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3691 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3691 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3691 are further described hereinbelow with reference to Table 1.

[51645] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3691 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[51646] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3692 (VGAM3692) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51647] VGAM3692 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3692 was detected is described hereinabove with reference to Figs. 2–8.

[51648] VGAM3692 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ictalurid herpesvirus 1. VGAM3692 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51649] VGAM3692 gene, herein designated VGAM GENE, encodes a VGAM3692 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3692 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3692 precursor RNA is designated SEQ ID:83449, and is provided hereinbelow with reference to the sequence listing part.

[51650] VGAM3692 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3692 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51651] An enzyme complex designated DICER COMPLEX, dices the VGAM3692 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3692 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3692 RNA is designated SEQ ID:83450,

and is provided hereinbelow with reference to the sequence listing part.

[51652] VGAM3692 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3692 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3692 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51653] VGAM3692 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3692 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3692 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3692 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3692 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51654] The complementary binding of VGAM3692 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3692 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3692 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3692 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51655] It is appreciated that VGAM3692 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3692 host target genes. The mRNA of each one of this plurality of VGAM3692 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3692 RNA, herein designated VGAM RNA, and which when bound by VGAM3692 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3692 host target proteins.

[51656] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3692 gene, herein designated VGAM GENE, on one or more VGAM3692 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51657] It is yet further appreciated that a function of VGAM3692 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3692 include diagnosis, prevention and treatment of viral infection by Ictalurid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3692 correlate with, and may be deduced from, the identity of the host target genes which VGAM3692 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51658] Nucleotide sequences of the VGAM3692 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3692 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3692 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3692 are further described hereinbelow with reference to Table 1.

[51659] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3692 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51660] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3693 (VGAM3693) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51661] VGAM3693 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3693 was detected is described hereinabove with reference to Figs. 2–8.

[51662] VGAM3693 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus. VGAM3693 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51663] VGAM3693 gene, herein designated VGAM GENE, encodes a VGAM3693 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3693 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3693 precu-

sor RNA is designated SEQ ID:83453, and is provided hereinbelow with reference to the sequence listing part.

[51664] VGAM3693 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3693 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51665] An enzyme complex designated DICER COMPLEX, dices the VGAM3693 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3693 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3693 RNA is designated SEQ ID:83454, and is provided hereinbelow with reference to the se-

quence listing part.

[51666] VGAM3693 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3693 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3693 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51667] VGAM3693 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3693 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3693 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3693 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3693 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51668] The complementary binding of VGAM3693 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3693 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3693 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3693 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51669] It is appreciated that VGAM3693 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3693 host target genes. The mRNA of each one of this plurality of VGAM3693 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3693 RNA, herein designated VGAM RNA, and which when bound by VGAM3693 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3693 host target proteins.

[51670] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3693 gene, herein designated VGAM GENE, on one or more VGAM3693 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51671] It is yet further appreciated that a function of VGAM3693

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3693 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3693 correlate with, and may be deduced from, the identity of the host target genes which VGAM3693 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51672] Nucleotide sequences of the VGAM3693 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3693 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3693 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3693 are further described hereinbelow with reference to Table 1.

[51673] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3693 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51674] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3694 (VGAM3694) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51675] VGAM3694 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3694 was detected is described hereinabove with reference to Figs. 2–8.

[51676] VGAM3694 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lumpy skin disease virus. VGAM3694 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51677] VGAM3694 gene, herein designated VGAM GENE, encodes a VGAM3694 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3694 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3694 precursor RNA is designated SEQ ID:83475, and is provided

hereinbelow with reference to the sequence listing part.

[51678] VGAM3694 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3694 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51679] An enzyme complex designated DICER COMPLEX, dices the VGAM3694 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3694 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3694 RNA is designated SEQ ID:83476, and is provided hereinbelow with reference to the sequence listing part.

[51680] VGAM3694 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3694 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3694 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51681] VGAM3694 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3694 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3694 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3694 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3694 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51682] The complementary binding of VGAM3694 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3694 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3694 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3694 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51683] It is appreciated that VGAM3694 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3694 host target genes. The mRNA of each one of this plurality of VGAM3694 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3694 RNA, herein designated VGAM RNA, and which when bound by VGAM3694 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3694 host target proteins.

[51684] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3694 gene, herein designated VGAM GENE, on one or more VGAM3694 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51685] It is yet further appreciated that a function of VGAM3694 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3694 include diagnosis, prevention and treatment of viral infection by Lumpy skin disease virus. Specific functions, and accordingly utilities, of VGAM3694 correlate with, and may be deduced from, the identity of the host target genes which VGAM3694 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51686] Nucleotide sequences of the VGAM3694 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3694 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3694 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3694 are further described hereinbelow with reference to Table 1.

[51687] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3694 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51688] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3695 (VGAM3695) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51689] VGAM3695 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3695 was detected is described hereinabove with reference to Figs. 2–8.

[51690] VGAM3695 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3695 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51691] VGAM3695 gene, herein designated VGAM GENE, encodes a VGAM3695 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3695 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3695 precursor RNA is designated SEQ ID:83640, and is provided hereinbelow with reference to the sequence listing part.

[51692] VGAM3695 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3695 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51693] An enzyme complex designated DICER COMPLEX, dices the VGAM3695 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3695 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3695 RNA is designated SEQ ID:83641, and is provided hereinbelow with reference to the sequence listing part.

[51694] VGAM3695 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3695 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3695 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51695] VGAM3695 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3695 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3695 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3695 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3695 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51696] The complementary binding of VGAM3695 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3695 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3695 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3695 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51697] It is appreciated that VGAM3695 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3695 host target genes. The mRNA of each one of this plurality of VGAM3695 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3695 RNA, herein designated VGAM

RNA, and which when bound by VGAM3695 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3695 host target proteins.

[51698] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3695 gene, herein designated VGAM GENE, on one or more VGAM3695 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51699] It is yet further appreciated that a function of VGAM3695 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3695 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3695 correlate with, and may be deduced from, the identity of the host target genes which VGAM3695 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51700] Nucleotide sequences of the VGAM3695 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3695 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3695 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3695 are further described hereinbelow with reference to Table 1.

[51701] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3695 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51702] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3696 (VGAM3696) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51703] VGAM3696 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3696 was detected is described hereinabove with reference to Figs. 2-8.

[51704] VGAM3696 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3696 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51705] VGAM3696 gene, herein designated VGAM GENE, encodes a VGAM3696 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3696 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3696 precursor RNA is designated SEQ ID:83645, and is provided hereinbelow with reference to the sequence listing part.

[51706] VGAM3696 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3696 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51707] An enzyme complex designated DICER COMPLEX, dices the VGAM3696 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3696 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3696 RNA is designated SEQ ID:83646, and is provided hereinbelow with reference to the sequence listing part.

[51708] VGAM3696 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3696 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3696 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51709] VGAM3696 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3696 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3696 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3696 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3696 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51710] The complementary binding of VGAM3696 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3696 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3696 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3696 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51711] It is appreciated that VGAM3696 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3696 host target genes. The mRNA of each one of this plurality of VGAM3696 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3696 RNA, herein designated VGAM RNA, and which when bound by VGAM3696 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3696 host target proteins.

[51712] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3696 gene, herein designated VGAM GENE, on one or more VGAM3696 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51713] It is yet further appreciated that a function of VGAM3696 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3696 include diagnosis, prevention and

treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3696 correlate with, and may be deduced from, the identity of the host target genes which VGAM3696 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51714] Nucleotide sequences of the VGAM3696 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3696 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3696 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3696 are further described hereinbelow with reference to Table 1.

[51715] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3696 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51716] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3697 (VGAM3697) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51717] VGAM3697 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3697 was detected is described hereinabove with reference to Figs. 2–8.

[51718] VGAM3697 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Phocoena spinipinnis papillomavirus. VGAM3697 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51719] VGAM3697 gene, herein designated VGAM GENE, encodes a VGAM3697 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3697 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3697 precursor RNA is designated SEQ ID:83651, and is provided hereinbelow with reference to the sequence listing part.

[51720] VGAM3697 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3697 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51721] An enzyme complex designated DICER COMPLEX, dices the VGAM3697 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3697 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3697 RNA is designated SEQ ID:83652, and is provided hereinbelow with reference to the sequence listing part.

[51722] VGAM3697 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3697 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3697 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51723] VGAM3697 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3697 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3697 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3697 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3697 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51724] The complementary binding of VGAM3697 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3697 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3697 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3697 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51725] It is appreciated that VGAM3697 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3697 host target genes. The mRNA of each one of this plurality of VGAM3697 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3697 RNA, herein designated VGAM RNA, and which when bound by VGAM3697 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3697 host target proteins.

[51726] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3697 gene, herein designated VGAM GENE, on one or more VGAM3697 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51727] It is yet further appreciated that a function of VGAM3697 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3697 include diagnosis, prevention and treatment of viral infection by *Phocoena spinipinnis* papil-

lomavirus. Specific functions, and accordingly utilities, of VGAM3697 correlate with, and may be deduced from, the identity of the host target genes which VGAM3697 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51728] Nucleotide sequences of the VGAM3697 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3697 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3697 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3697 are further described hereinbelow with reference to Table 1.

[51729] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3697 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51730] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3698 (VGAM3698) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[51731] VGAM3698 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3698 was detected is described hereinabove with reference to Figs. 2–8.

[51732] VGAM3698 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3698 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51733] VGAM3698 gene, herein designated VGAM GENE, encodes a VGAM3698 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3698 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3698 precursor RNA is designated SEQ ID:83658, and is provided hereinbelow with reference to the sequence listing part.

[51734] VGAM3698 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3698 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51735] An enzyme complex designated DICER COMPLEX, dices the VGAM3698 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3698 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3698 RNA is designated SEQ ID:83659, and is provided hereinbelow with reference to the sequence listing part.

[51736] VGAM3698 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3698 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3698 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51737] VGAM3698 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3698 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3698 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3698 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3698 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51738] The complementary binding of VGAM3698 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3698 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3698 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3698 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51739] It is appreciated that VGAM3698 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3698 host target genes. The mRNA of each one of this plurality of VGAM3698 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3698 RNA, herein designated VGAM RNA, and which when bound by VGAM3698 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3698 host target proteins.

[51740] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3698 gene, herein designated VGAM GENE, on one or more VGAM3698 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51741] It is yet further appreciated that a function of VGAM3698 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3698 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3698

correlate with, and may be deduced from, the identity of the host target genes which VGAM3698 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51742] Nucleotide sequences of the VGAM3698 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3698 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3698 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3698 are further described hereinbelow with reference to Table 1.

[51743] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3698 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51744] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3699 (VGAM3699) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[51745] VGAM3699 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3699 was detected is described hereinabove with reference to Figs. 2–8.

[51746] VGAM3699 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV–1. VGAM3699 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51747] VGAM3699 gene, herein designated VGAM GENE, encodes a VGAM3699 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3699 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3699 precursor RNA is designated SEQ ID:83666, and is provided hereinbelow with reference to the sequence listing part.

[51748] VGAM3699 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3699 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51749] An enzyme complex designated DICER COMPLEX, dices the VGAM3699 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3699 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3699 RNA is designated SEQ ID:83667, and is provided hereinbelow with reference to the sequence listing part.

[51750] VGAM3699 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3699 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3699 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51751] VGAM3699 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3699 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3699 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3699 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3699 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51752] The complementary binding of VGAM3699 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3699 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3699 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3699 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51753] It is appreciated that VGAM3699 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3699 host target genes. The mRNA of each one of this plurality of VGAM3699 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3699 RNA, herein designated VGAM RNA, and which when bound by VGAM3699 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3699 host target proteins.

[51754] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3699 gene, herein designated VGAM GENE, on one or more VGAM3699 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51755] It is yet further appreciated that a function of VGAM3699 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3699 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-1. Specific functions, and accordingly utilities, of VGAM3699 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3699 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51756] Nucleotide sequences of the VGAM3699 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3699 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3699 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3699 are further described hereinbelow with reference to Table 1.

[51757] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3699 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51758] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3700 (VGAM3700) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51759] VGAM3700 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3700 was detected is described hereinabove with reference to Figs. 2–8.

[51760] VGAM3700 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Camelpox virus. VGAM3700 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51761] VGAM3700 gene, herein designated VGAM GENE, encodes a VGAM3700 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3700 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3700 precursor RNA is designated SEQ ID:83673, and is provided hereinbelow with reference to the sequence listing part.

[51762] VGAM3700 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3700 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51763] An enzyme complex designated DICER COMPLEX, dices the VGAM3700 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3700 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3700 RNA is designated SEQ ID:83674, and is provided hereinbelow with reference to the sequence listing part.

[51764] VGAM3700 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3700 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3700 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51765] VGAM3700 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3700 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3700 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3700 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3700 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51766] The complementary binding of VGAM3700 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3700 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3700 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3700 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51767] It is appreciated that VGAM3700 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3700 host target genes. The mRNA of each one of this plurality of VGAM3700 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3700 RNA, herein designated VGAM RNA, and which when bound by VGAM3700 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3700 host target proteins.

[51768] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3700 gene, herein designated VGAM GENE, on one or more VGAM3700 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51769] It is yet further appreciated that a function of VGAM3700 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3700 include diagnosis, prevention and treatment of viral infection by Camelpox virus. Specific functions, and accordingly utilities, of VGAM3700 correlate with, and may be deduced from, the identity of the host target genes which VGAM3700 binds and inhibits,

and the function of these host target genes, as elaborated hereinbelow.

[51770] Nucleotide sequences of the VGAM3700 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3700 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3700 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3700 are further described hereinbelow with reference to Table 1.

[51771] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3700 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51772] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3701 (VGAM3701) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51773] VGAM3701 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3701 was detected is described hereinabove with reference to Figs. 2–8.

[51774] VGAM3701 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3701 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51775] VGAM3701 gene, herein designated VGAM GENE, encodes a VGAM3701 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3701 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3701 precursor RNA is designated SEQ ID:83688, and is provided hereinbelow with reference to the sequence listing part.

[51776] VGAM3701 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3701 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51777] An enzyme complex designated DICER COMPLEX, dices the VGAM3701 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3701 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3701 RNA is designated SEQ ID:83689, and is provided hereinbelow with reference to the sequence listing part.

[51778] VGAM3701 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3701 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3701 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51779] VGAM3701 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3701 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3701 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3701 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3701 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[51780] The complementary binding of VGAM3701 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3701 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3701 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3701 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51781] It is appreciated that VGAM3701 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3701 host target genes. The mRNA of each one of this plurality of VGAM3701 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3701 RNA, herein designated VGAM RNA, and which when bound by VGAM3701 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3701 host target proteins.

[51782] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3701 gene, herein designated VGAM GENE, on one or more VGAM3701 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51783] It is yet further appreciated that a function of VGAM3701 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3701 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3701 correlate with, and may be deduced from, the identity of the host target genes which VGAM3701 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[51784] Nucleotide sequences of the VGAM3701 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3701 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3701 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3701 are further described hereinbelow with reference to Table 1.

[51785] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3701 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51786] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3702 (VGAM3702) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51787] VGAM3702 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3702 was detected is described hereinabove with reference to Figs. 2–8.

[51788] VGAM3702 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3702 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51789] VGAM3702 gene, herein designated VGAM GENE, encodes a VGAM3702 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3702 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3702 precursor RNA is designated SEQ ID:83702, and is provided hereinbelow with reference to the sequence listing part.

[51790] VGAM3702 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3702 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51791] An enzyme complex designated DICER COMPLEX, dices the VGAM3702 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3702 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3702 RNA is designated SEQ ID:83703, and is provided hereinbelow with reference to the sequence listing part.

[51792] VGAM3702 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3702 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3702 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[51793] VGAM3702 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3702 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3702 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3702 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3702 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51794] The complementary binding of VGAM3702 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3702 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3702 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3702 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51795] It is appreciated that VGAM3702 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3702 host target genes. The mRNA of each one of this plurality of VGAM3702 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3702 RNA, herein designated VGAM RNA, and which when bound by VGAM3702 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3702 host target proteins.

[51796] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3702 gene, herein designated VGAM GENE, on one

or more VGAM3702 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51797] It is yet further appreciated that a function of VGAM3702 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3702 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3702 correlate with, and may be deduced from, the identity of the host target genes which VGAM3702 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51798] Nucleotide sequences of the VGAM3702 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3702 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3702 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3702 are further described hereinbelow with reference to Table 1.

[51799] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3702 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51800] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3703 (VGAM3703) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51801] VGAM3703 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3703 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[51802] VGAM3703 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 3.

VGAM3703 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51803] VGAM3703 gene, herein designated VGAM GENE, encodes a VGAM3703 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3703 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3703 precursor RNA is designated SEQ ID:83720, and is provided hereinbelow with reference to the sequence listing part.

[51804] VGAM3703 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3703 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51805] An enzyme complex designated DICER COMPLEX, dices the VGAM3703 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3703 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3703 RNA is designated SEQ ID:83721, and is provided hereinbelow with reference to the sequence listing part.

[51806] VGAM3703 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3703 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3703 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51807] VGAM3703 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3703 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3703 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3703 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3703 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51808] The complementary binding of VGAM3703 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3703 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3703 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3703 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51809] It is appreciated that VGAM3703 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3703 host target genes. The mRNA of each one of this plurality of VGAM3703 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3703 RNA, herein designated VGAM RNA, and which when bound by VGAM3703 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3703 host target proteins.

[51810] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3703 gene, herein designated VGAM GENE, on one or more VGAM3703 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51811] It is yet further appreciated that a function of VGAM3703 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3703 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3703 correlate with, and may be deduced from, the identity of the host target genes which VGAM3703 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51812] Nucleotide sequences of the VGAM3703 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3703 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3703 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3703 are further described hereinbelow with reference to Table 1.

[51813] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3703 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51814] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3704 (VGAM3704) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51815] VGAM3704 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3704 was detected is described hereinabove with reference to Figs. 2-8.

[51816] VGAM3704 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3. VGAM3704 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51817] VGAM3704 gene, herein designated VGAM GENE, encodes a VGAM3704 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3704 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3704 precursor RNA is designated SEQ ID:83741, and is provided hereinbelow with reference to the sequence listing part.

[51818] VGAM3704 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3704 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[51819] An enzyme complex designated DICER COMPLEX, dices the VGAM3704 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3704 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3704 RNA is designated SEQ ID:83742, and is provided hereinbelow with reference to the sequence listing part.

[51820] VGAM3704 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3704 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3704 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51821] VGAM3704 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3704 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3704 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3704 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3704 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51822] The complementary binding of VGAM3704 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3704 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3704 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3704 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51823] It is appreciated that VGAM3704 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3704 host target genes. The mRNA of each one of this plurality of VGAM3704 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3704 RNA, herein designated VGAM RNA, and which when bound by VGAM3704 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3704 host target proteins.

[51824] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3704 gene, herein designated VGAM GENE, on one or more VGAM3704 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51825] It is yet further appreciated that a function of VGAM3704 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3704 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3704 correlate with, and may be deduced from, the identity of the host target genes which VGAM3704 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51826] Nucleotide sequences of the VGAM3704 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3704 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3704 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3704 are further described hereinbelow with reference to Table 1.

[51827] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3704 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51828] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3705 (VGAM3705) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51829] VGAM3705 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3705 was detected is described hereinabove with reference to Figs. 2-8.

[51830] VGAM3705 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Cherry mottle leaf virus. VGAM3705 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51831] VGAM3705 gene, herein designated VGAM GENE, encodes a VGAM3705 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3705 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3705 precursor RNA is designated SEQ ID:83751, and is provided hereinbelow with reference to the sequence listing part.

[51832] VGAM3705 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3705 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51833] An enzyme complex designated DICER COMPLEX, dices the VGAM3705 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3705 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3705 RNA is designated SEQ ID:83752, and is provided hereinbelow with reference to the sequence listing part.

[51834] VGAM3705 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3705 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3705 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51835] VGAM3705 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3705 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3705 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3705 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3705 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51836] The complementary binding of VGAM3705 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3705 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3705 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3705 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51837] It is appreciated that VGAM3705 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3705 host target genes. The mRNA of each one of this plurality of VGAM3705 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3705 RNA, herein designated VGAM RNA, and which when bound by VGAM3705 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3705 host target proteins.

[51838] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3705 gene, herein designated VGAM GENE, on one or more VGAM3705 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51839] It is yet further appreciated that a function of VGAM3705 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3705 include diagnosis, prevention and treatment of viral infection by Cherry mottle leaf virus. Specific functions, and accordingly utilities, of VGAM3705 correlate with, and may be deduced from, the identity of the host target genes which VGAM3705 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51840] Nucleotide sequences of the VGAM3705 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3705 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3705 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3705 are further described hereinbelow with reference to Table 1.

[51841] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3705 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51842] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3706 (VGAM3706) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51843] VGAM3706 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3706 was detected is described hereinabove with reference to Figs. 2-8.

[51844] VGAM3706 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Little cherry virus.

VGAM3706 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51845] VGAM3706 gene, herein designated VGAM GENE, encodes a VGAM3706 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3706 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3706 precursor RNA is designated SEQ ID:83763, and is provided hereinbelow with reference to the sequence listing part.

[51846] VGAM3706 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3706 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51847] An enzyme complex designated DICER COMPLEX, dices

the VGAM3706 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3706 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3706 RNA is designated SEQ ID:83764, and is provided hereinbelow with reference to the sequence listing part.

[51848] VGAM3706 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3706 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3706 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51849] VGAM3706 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3706 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3706 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3706 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3706 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51850] The complementary binding of VGAM3706 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3706 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3706 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3706 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51851] It is appreciated that VGAM3706 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3706 host target genes. The mRNA of each one of this plurality of VGAM3706 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3706 RNA, herein designated VGAM RNA, and which when bound by VGAM3706 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3706 host target proteins.

[51852] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3706 gene, herein designated VGAM GENE, on one or more VGAM3706 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51853] It is yet further appreciated that a function of VGAM3706 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3706 include diagnosis, prevention and treatment of viral infection by Little cherry virus. Specific functions, and accordingly utilities, of VGAM3706 correlate with, and may be deduced from, the identity of the host target genes which VGAM3706 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51854] Nucleotide sequences of the VGAM3706 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3706 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3706 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3706 are further described hereinbelow with reference to Table 1.

[51855] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3706 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51856] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3707 (VGAM3707) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51857] VGAM3707 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3707 was detected is described hereinabove with reference to Figs. 2-8.

[51858] VGAM3707 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3707 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51859] VGAM3707 gene, herein designated VGAM GENE, encodes a VGAM3707 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3707 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3707 precursor RNA is designated SEQ ID:83778, and is provided hereinbelow with reference to the sequence listing part.

[51860] VGAM3707 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3707 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51861] An enzyme complex designated DICER COMPLEX, dices the VGAM3707 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3707 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3707 RNA is designated SEQ ID:83779, and is provided hereinbelow with reference to the sequence listing part.

[51862] VGAM3707 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3707 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3707 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51863] VGAM3707 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3707 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3707 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3707 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3707 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51864] The complementary binding of VGAM3707 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3707 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3707

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3707 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51865] It is appreciated that VGAM3707 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3707 host target genes. The mRNA of each one of this plurality of VGAM3707 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3707 RNA, herein designated VGAM RNA, and which when bound by VGAM3707 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3707 host target proteins.

[51866] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3707 gene, herein designated VGAM GENE, on one or more VGAM3707 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51867] It is yet further appreciated that a function of VGAM3707 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3707 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3707 correlate with, and may be deduced from, the identity of the host target genes which VGAM3707 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51868] Nucleotide sequences of the VGAM3707 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3707 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3707 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3707 are further described hereinbelow with reference to Table 1.

[51869] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3707 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51870] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3708 (VGAM3708) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51871] VGAM3708 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3708 was detected is described hereinabove with reference to Figs. 2-8.

[51872] VGAM3708 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Wheat streak mosaic virus. VGAM3708 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[51873] VGAM3708 gene, herein designated VGAM GENE, encodes a VGAM3708 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3708 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3708 precursor RNA is designated SEQ ID:83785, and is provided hereinbelow with reference to the sequence listing part.

[51874] VGAM3708 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3708 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51875] An enzyme complex designated DICER COMPLEX, dices the VGAM3708 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3708 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3708 RNA is designated SEQ ID:83786, and is provided hereinbelow with reference to the sequence listing part.

[51876] VGAM3708 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3708 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3708 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51877] VGAM3708 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3708 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3708 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3708 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3708 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51878] The complementary binding of VGAM3708 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3708 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3708 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3708 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51879] It is appreciated that VGAM3708 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3708 host target genes. The mRNA of each one of this plurality of VGAM3708 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3708 RNA, herein designated VGAM RNA, and which when bound by VGAM3708 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3708 host target proteins.

[51880] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3708 gene, herein designated VGAM GENE, on one or more VGAM3708 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51881] It is yet further appreciated that a function of VGAM3708 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3708 include diagnosis, prevention and treatment of viral infection by Wheat streak mosaic virus. Specific functions, and accordingly utilities, of VGAM3708 correlate with, and may be deduced from, the identity of the host target genes which VGAM3708 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51882] Nucleotide sequences of the VGAM3708 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3708 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3708 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3708 are further

described hereinbelow with reference to Table 1.

[51883] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3708 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51884] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3709 (VGAM3709) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51885] VGAM3709 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3709 was detected is described hereinabove with reference to Figs. 2-8.

[51886] VGAM3709 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 8. VGAM3709 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51887] VGAM3709 gene, herein designated VGAM GENE, encodes a VGAM3709 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3709 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3709 precursor RNA is designated SEQ ID:83791, and is provided hereinbelow with reference to the sequence listing part.

[51888] VGAM3709 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3709 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51889] An enzyme complex designated DICER COMPLEX, dices the VGAM3709 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3709 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3709 RNA is designated SEQ ID:83792, and is provided hereinbelow with reference to the sequence listing part.

[51890] VGAM3709 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3709 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3709 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51891] VGAM3709 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3709 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3709 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3709 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3709 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51892] The complementary binding of VGAM3709 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3709 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3709 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3709 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51893] It is appreciated that VGAM3709 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3709 host target genes. The mRNA of each one of this plurality of VGAM3709 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3709 RNA, herein designated VGAM RNA, and which when bound by VGAM3709 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3709 host target proteins.

[51894] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3709 gene, herein designated VGAM GENE, on one or more VGAM3709 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51895] It is yet further appreciated that a function of VGAM3709 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3709 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 8. Specific functions, and accordingly utilities, of VGAM3709 correlate with, and may be deduced from, the identity of the host target genes which VGAM3709 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51896] Nucleotide sequences of the VGAM3709 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3709 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3709 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3709 are further described hereinbelow with reference to Table 1.

[51897] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3709 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51898] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3710 (VGAM3710) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51899] VGAM3710 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3710 was detected is described hereinabove with reference to Figs. 2-8.

[51900] VGAM3710 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3710 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51901] VGAM3710 gene, herein designated VGAM GENE, encodes

a VGAM3710 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3710 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3710 precursor RNA is designated SEQ ID:83895, and is provided hereinbelow with reference to the sequence listing part.

[51902] VGAM3710 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3710 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51903] An enzyme complex designated DICER COMPLEX, dices the VGAM3710 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3710 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3710 RNA is designated SEQ ID:83896, and is provided hereinbelow with reference to the sequence listing part.

[51904] VGAM3710 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3710 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3710 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51905] VGAM3710 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3710 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3710 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3710 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3710 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51906] The complementary binding of VGAM3710 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3710 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3710 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3710 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[51907] It is appreciated that VGAM3710 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3710 host target genes. The mRNA of each one of this plurality of VGAM3710 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3710 RNA, herein designated VGAM RNA, and which when bound by VGAM3710 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3710 host target proteins.

[51908] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3710 gene, herein designated VGAM GENE, on one or more VGAM3710 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51909] It is yet further appreciated that a function of VGAM3710 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3710 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3710 correlate with, and may be deduced from, the identity of the host target genes which VGAM3710 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51910] Nucleotide sequences of the VGAM3710 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3710 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3710 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3710 are further described hereinbelow with reference to Table 1.

[51911] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3710 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51912] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3711 (VGAM3711) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51913] VGAM3711 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3711 was detected is described hereinabove with reference to Figs. 2-8.

[51914] VGAM3711 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Beet soil-borne mosaic virus. VGAM3711 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51915] VGAM3711 gene, herein designated VGAM GENE, encodes a VGAM3711 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3711 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3711 precursor RNA is designated SEQ ID:83898, and is provided hereinbelow with reference to the sequence listing part.

[51916] VGAM3711 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3711 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51917] An enzyme complex designated DICER COMPLEX, dices the VGAM3711 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3711 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3711 RNA is designated SEQ ID:83899, and is provided hereinbelow with reference to the sequence listing part.

[51918] VGAM3711 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3711 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3711 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51919] VGAM3711 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3711 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3711 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3711 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3711 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51920] The complementary binding of VGAM3711 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3711 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3711 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3711 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51921] It is appreciated that VGAM3711 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3711 host target genes. The mRNA of each one of this plurality of VGAM3711 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3711 RNA, herein designated VGAM RNA, and which when bound by VGAM3711 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3711 host target proteins.

[51922] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3711 gene, herein designated VGAM GENE, on one or more VGAM3711 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51923] It is yet further appreciated that a function of VGAM3711 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3711 include diagnosis, prevention and treatment of viral infection by Beet soil-borne mosaic virus. Specific functions, and accordingly utilities, of VGAM3711 correlate with, and may be deduced from, the identity of the host target genes which VGAM3711 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51924] Nucleotide sequences of the VGAM3711 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3711 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3711 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3711 are further described hereinbelow with reference to Table 1.

[51925] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3711 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51926] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3712 (VGAM3712) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51927] VGAM3712 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3712 was detected is described hereinabove with reference to Figs. 2-8.

[51928] VGAM3712 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3712 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51929] VGAM3712 gene, herein designated VGAM GENE, encodes a VGAM3712 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3712 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3712 precursor RNA is designated SEQ ID:83924, and is provided hereinbelow with reference to the sequence listing part.

[51930] VGAM3712 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3712 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51931] An enzyme complex designated DICER COMPLEX, dices the VGAM3712 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3712 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3712 RNA is designated SEQ ID:83925, and is provided hereinbelow with reference to the sequence listing part.

[51932] VGAM3712 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3712 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3712 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51933] VGAM3712 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3712 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3712 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3712 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3712 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51934] The complementary binding of VGAM3712 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3712 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3712 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3712 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51935] It is appreciated that VGAM3712 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3712 host target genes. The mRNA of each one of this plurality of VGAM3712 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3712 RNA, herein designated VGAM RNA, and which when bound by VGAM3712 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3712 host target proteins.

[51936] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3712 gene, herein designated VGAM GENE, on one or more VGAM3712 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51937] It is yet further appreciated that a function of VGAM3712 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3712 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3712 correlate with, and may be deduced from, the identity of the host target genes which VGAM3712 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51938] Nucleotide sequences of the VGAM3712 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3712 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3712 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3712 are further described hereinbelow with reference to Table 1.

[51939] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3712 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51940] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3713 (VGAM3713) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51941] VGAM3713 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3713 was detected is described hereinabove with reference to Figs. 2–8.

[51942] VGAM3713 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice yellow stunt virus. VGAM3713 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51943] VGAM3713 gene, herein designated VGAM GENE, encodes a VGAM3713 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3713 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3713 precursor RNA is designated SEQ ID:83932, and is provided hereinbelow with reference to the sequence listing part.

[51944] VGAM3713 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3713 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51945] An enzyme complex designated DICER COMPLEX, dices the VGAM3713 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3713 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3713 RNA is designated SEQ ID:83933, and is provided hereinbelow with reference to the sequence listing part.

[51946] VGAM3713 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3713 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3713 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51947] VGAM3713 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3713 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3713 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3713 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3713 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51948] The complementary binding of VGAM3713 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3713 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3713 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3713 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51949] It is appreciated that VGAM3713 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3713 host target genes. The mRNA of each one of this plurality of VGAM3713 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3713 RNA, herein designated VGAM RNA, and which when bound by VGAM3713 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3713 host target proteins.

[51950] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3713 gene, herein designated VGAM GENE, on one or more VGAM3713 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[51951] It is yet further appreciated that a function of VGAM3713 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3713 include diagnosis, prevention and treatment of viral infection by Rice yellow stunt virus. Specific functions, and accordingly utilities, of VGAM3713 correlate with, and may be deduced from, the identity of the host target genes which VGAM3713 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51952] Nucleotide sequences of the VGAM3713 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3713 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3713 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3713 are further described hereinbelow with reference to Table 1.

[51953] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3713 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51954] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3714 (VGAM3714) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51955] VGAM3714 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3714 was detected is described hereinabove with reference to Figs. 2-8.

[51956] VGAM3714 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lymphocystis disease virus 1. VGAM3714 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51957] VGAM3714 gene, herein designated VGAM GENE, encodes a VGAM3714 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3714 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3714 precursor RNA is designated SEQ ID:83973, and is provided hereinbelow with reference to the sequence listing part.

[51958] VGAM3714 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3714 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51959] An enzyme complex designated DICER COMPLEX, dices the VGAM3714 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3714 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3714 RNA is designated SEQ ID:83974, and is provided hereinbelow with reference to the sequence listing part.

[51960] VGAM3714 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3714 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3714 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51961] VGAM3714 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3714 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3714 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3714 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3714 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51962] The complementary binding of VGAM3714 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3714 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3714 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3714 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51963] It is appreciated that VGAM3714 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3714 host target genes. The mRNA of

each one of this plurality of VGAM3714 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3714 RNA, herein designated VGAM RNA, and which when bound by VGAM3714 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3714 host target proteins.

[51964] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3714 gene, herein designated VGAM GENE, on one or more VGAM3714 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[51965] It is yet further appreciated that a function of VGAM3714 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3714 include diagnosis, prevention and treatment of viral infection by Lymphocystis disease virus 1. Specific functions, and accordingly utilities, of VGAM3714 correlate with, and may be deduced from, the identity of the host target genes which VGAM3714 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51966] Nucleotide sequences of the VGAM3714 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3714 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3714 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3714 are further described hereinbelow with reference to Table 1.

[51967] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3714 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[51968] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3715 (VGAM3715) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51969] VGAM3715 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3715 was detected is described hereinabove with reference to Figs. 2–8.

[51970] VGAM3715 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 1. VGAM3715 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51971] VGAM3715 gene, herein designated VGAM GENE, encodes a VGAM3715 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3715 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3715 precursor RNA is designated SEQ ID:83978, and is provided hereinbelow with reference to the sequence listing part.

[51972] VGAM3715 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3715 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51973] An enzyme complex designated DICER COMPLEX, dices the VGAM3715 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3715 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3715 RNA is designated SEQ ID:83979,

and is provided hereinbelow with reference to the sequence listing part.

[51974] VGAM3715 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3715 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3715 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51975] VGAM3715 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3715 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3715 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3715 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3715 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51976] The complementary binding of VGAM3715 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3715 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3715 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3715 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51977] It is appreciated that VGAM3715 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3715 host target genes. The mRNA of each one of this plurality of VGAM3715 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3715 RNA, herein designated VGAM RNA, and which when bound by VGAM3715 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3715 host target proteins.

[51978] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3715 gene, herein designated VGAM GENE, on one or more VGAM3715 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51979] It is yet further appreciated that a function of VGAM3715 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3715 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3715 correlate with, and may be deduced from, the identity of the host target genes which VGAM3715 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51980] Nucleotide sequences of the VGAM3715 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3715 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3715 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3715 are further described hereinbelow with reference to Table 1.

[51981] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3715 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51982] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3716 (VGAM3716) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51983] VGAM3716 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3716 was detected is described hereinabove with reference to Figs. 2–8.

[51984] VGAM3716 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 1. VGAM3716 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51985] VGAM3716 gene, herein designated VGAM GENE, encodes a VGAM3716 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3716 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3716 precu-

sor RNA is designated SEQ ID:84008, and is provided hereinbelow with reference to the sequence listing part.

[51986] VGAM3716 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3716 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[51987] An enzyme complex designated DICER COMPLEX, dices the VGAM3716 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3716 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3716 RNA is designated SEQ ID:84009, and is provided hereinbelow with reference to the se-

quence listing part.

[51988] VGAM3716 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3716 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3716 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[51989] VGAM3716 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3716 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3716 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3716 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3716 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[51990] The complementary binding of VGAM3716 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3716 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3716 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3716 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[51991] It is appreciated that VGAM3716 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3716 host target genes. The mRNA of each one of this plurality of VGAM3716 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3716 RNA, herein designated VGAM RNA, and which when bound by VGAM3716 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3716 host target proteins.

[51992] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3716 gene, herein designated VGAM GENE, on one or more VGAM3716 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[51993] It is yet further appreciated that a function of VGAM3716 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3716 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3716 correlate with, and may be deduced from, the identity of the host target genes which VGAM3716 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[51994] Nucleotide sequences of the VGAM3716 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3716 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3716 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3716 are further described hereinbelow with reference to Table 1.

[51995] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3716 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[51996] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3717 (VGAM3717) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[51997] VGAM3717 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3717 was detected is described hereinabove with reference to Figs. 2–8.

[51998] VGAM3717 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3717 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[51999] VGAM3717 gene, herein designated VGAM GENE, encodes a VGAM3717 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3717 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3717 precursor RNA is designated SEQ ID:84011, and is provided hereinbelow with reference to the sequence listing part.

[52000] VGAM3717 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3717 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52001] An enzyme complex designated DICER COMPLEX, dices the VGAM3717 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3717 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3717 RNA is designated SEQ ID:84012, and is provided hereinbelow with reference to the sequence listing part.

[52002] VGAM3717 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3717 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3717 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52003] VGAM3717 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3717 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3717 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3717 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3717 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52004] The complementary binding of VGAM3717 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3717 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3717 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3717 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52005] It is appreciated that VGAM3717 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3717 host target genes. The mRNA of each one of this plurality of VGAM3717 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3717 RNA, herein designated VGAM

RNA, and which when bound by VGAM3717 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3717 host target proteins.

[52006] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3717 gene, herein designated VGAM GENE, on one or more VGAM3717 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52007] It is yet further appreciated that a function of VGAM3717 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3717 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3717 correlate with, and may be deduced from, the identity of the host target genes which VGAM3717 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52008] Nucleotide sequences of the VGAM3717 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3717 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3717 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3717 are further described hereinbelow with reference to Table 1.

[52009] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3717 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52010] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3718 (VGAM3718) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52011] VGAM3718 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3718 was detected is described hereinabove with reference to Figs. 2–8.

[52012] VGAM3718 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3718 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52013] VGAM3718 gene, herein designated VGAM GENE, encodes a VGAM3718 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3718 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3718 precursor RNA is designated SEQ ID:84019, and is provided hereinbelow with reference to the sequence listing part.

[52014] VGAM3718 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3718 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52015] An enzyme complex designated DICER COMPLEX, dices the VGAM3718 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3718 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3718 RNA is designated SEQ ID:84020, and is provided hereinbelow with reference to the sequence listing part.

[52016] VGAM3718 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3718 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3718 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52017] VGAM3718 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3718 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3718 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3718 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3718 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52018] The complementary binding of VGAM3718 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3718 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3718 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3718 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52019] It is appreciated that VGAM3718 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3718 host target genes. The mRNA of each one of this plurality of VGAM3718 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3718 RNA, herein designated VGAM RNA, and which when bound by VGAM3718 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3718 host target proteins.

[52020] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3718 gene, herein designated VGAM GENE, on one or more VGAM3718 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52021] It is yet further appreciated that a function of VGAM3718 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3718 include diagnosis, prevention and

treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3718 correlate with, and may be deduced from, the identity of the host target genes which VGAM3718 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52022] Nucleotide sequences of the VGAM3718 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3718 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3718 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3718 are further described hereinbelow with reference to Table 1.

[52023] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3718 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52024] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3719 (VGAM3719) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52025] VGAM3719 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3719 was detected is described hereinabove with reference to Figs. 2–8.

[52026] VGAM3719 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sida golden mosaic virus. VGAM3719 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52027] VGAM3719 gene, herein designated VGAM GENE, encodes a VGAM3719 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3719 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3719 precursor RNA is designated SEQ ID:84046, and is provided hereinbelow with reference to the sequence listing part.

[52028] VGAM3719 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3719 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52029] An enzyme complex designated DICER COMPLEX, dices the VGAM3719 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3719 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3719 RNA is designated SEQ ID:84047, and is provided hereinbelow with reference to the sequence listing part.

[52030] VGAM3719 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3719 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3719 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52031] VGAM3719 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3719 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3719 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3719 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3719 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52032] The complementary binding of VGAM3719 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3719 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3719 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3719 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52033] It is appreciated that VGAM3719 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3719 host target genes. The mRNA of each one of this plurality of VGAM3719 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3719 RNA, herein designated VGAM RNA, and which when bound by VGAM3719 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3719 host target proteins.

[52034] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3719 gene, herein designated VGAM GENE, on one or more VGAM3719 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52035] It is yet further appreciated that a function of VGAM3719 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3719 include diagnosis, prevention and treatment of viral infection by Sida golden mosaic virus.

Specific functions, and accordingly utilities, of VGAM3719 correlate with, and may be deduced from, the identity of the host target genes which VGAM3719 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52036] Nucleotide sequences of the VGAM3719 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3719 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3719 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3719 are further described hereinbelow with reference to Table 1.

[52037] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3719 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52038] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3720 (VGAM3720) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[52039] VGAM3720 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3720 was detected is described hereinabove with reference to Figs. 2–8.

[52040] VGAM3720 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ryegrass mottle virus. VGAM3720 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52041] VGAM3720 gene, herein designated VGAM GENE, encodes a VGAM3720 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3720 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3720 precursor RNA is designated SEQ ID:84053, and is provided hereinbelow with reference to the sequence listing part.

[52042] VGAM3720 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3720 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52043] An enzyme complex designated DICER COMPLEX, dices the VGAM3720 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3720 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3720 RNA is designated SEQ ID:84054, and is provided hereinbelow with reference to the sequence listing part.

[52044] VGAM3720 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3720 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3720 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52045] VGAM3720 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3720 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3720 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3720 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3720 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52046] The complementary binding of VGAM3720 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3720 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3720 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3720 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52047] It is appreciated that VGAM3720 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3720 host target genes. The mRNA of each one of this plurality of VGAM3720 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3720 RNA, herein designated VGAM RNA, and which when bound by VGAM3720 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3720 host target proteins.

[52048] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3720 gene, herein designated VGAM GENE, on one or more VGAM3720 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52049] It is yet further appreciated that a function of VGAM3720 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3720 include diagnosis, prevention and treatment of viral infection by Ryegrass mottle virus. Specific functions, and accordingly utilities, of VGAM3720

correlate with, and may be deduced from, the identity of the host target genes which VGAM3720 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52050] Nucleotide sequences of the VGAM3720 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3720 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3720 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3720 are further described hereinbelow with reference to Table 1.

[52051] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3720 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52052] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3721 (VGAM3721) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[52053] VGAM3721 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3721 was detected is described hereinabove with reference to Figs. 2–8.

[52054] VGAM3721 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus D. VGAM3721 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52055] VGAM3721 gene, herein designated VGAM GENE, encodes a VGAM3721 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3721 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3721 precursor RNA is designated SEQ ID:84065, and is provided hereinbelow with reference to the sequence listing part.

[52056] VGAM3721 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3721 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52057] An enzyme complex designated DICER COMPLEX, dices the VGAM3721 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3721 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3721 RNA is designated SEQ ID:84066, and is provided hereinbelow with reference to the sequence listing part.

[52058] VGAM3721 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3721 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3721 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52059] VGAM3721 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3721 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3721 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3721 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3721 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52060] The complementary binding of VGAM3721 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3721 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3721 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3721 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52061] It is appreciated that VGAM3721 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3721 host target genes. The mRNA of each one of this plurality of VGAM3721 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3721 RNA, herein designated VGAM RNA, and which when bound by VGAM3721 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3721 host target proteins.

[52062] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3721 gene, herein designated VGAM GENE, on one or more VGAM3721 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52063] It is yet further appreciated that a function of VGAM3721 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3721 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus D. Specific functions, and accordingly utilities, of VGAM3721 correlate with, and may be deduced from, the identity of the

host target genes which VGAM3721 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52064] Nucleotide sequences of the VGAM3721 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3721 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3721 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3721 are further described hereinbelow with reference to Table 1.

[52065] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3721 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52066] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3722 (VGAM3722) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52067] VGAM3722 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3722 was detected is described hereinabove with reference to Figs. 2–8.

[52068] VGAM3722 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3722 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52069] VGAM3722 gene, herein designated VGAM GENE, encodes a VGAM3722 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3722 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3722 precursor RNA is designated SEQ ID:84081, and is provided hereinbelow with reference to the sequence listing part.

[52070] VGAM3722 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3722 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52071] An enzyme complex designated DICER COMPLEX, dices the VGAM3722 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3722 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3722 RNA is designated SEQ ID:84082, and is provided hereinbelow with reference to the sequence listing part.

[52072] VGAM3722 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3722 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3722 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52073] VGAM3722 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3722 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3722 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3722 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3722 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52074] The complementary binding of VGAM3722 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3722 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3722 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3722 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52075] It is appreciated that VGAM3722 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3722 host target genes. The mRNA of each one of this plurality of VGAM3722 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3722 RNA, herein designated VGAM RNA, and which when bound by VGAM3722 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3722 host target proteins.

[52076] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3722 gene, herein designated VGAM GENE, on one or more VGAM3722 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52077] It is yet further appreciated that a function of VGAM3722 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3722 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3722 correlate with, and may be deduced from, the identity of the host target genes which VGAM3722 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[52078] Nucleotide sequences of the VGAM3722 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3722 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3722 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3722 are further described hereinbelow with reference to Table 1.

[52079] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3722 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52080] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3723 (VGAM3723) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52081] VGAM3723 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3723 was detected is described hereinabove with reference to Figs. 2–8.

[52082] VGAM3723 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3723 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52083] VGAM3723 gene, herein designated VGAM GENE, encodes a VGAM3723 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3723 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3723 precursor RNA is designated SEQ ID:84099, and is provided hereinbelow with reference to the sequence listing part.

[52084] VGAM3723 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3723 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52085] An enzyme complex designated DICER COMPLEX, dices the VGAM3723 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3723 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3723 RNA is designated SEQ ID:84100, and is provided hereinbelow with reference to the sequence listing part.

[52086] VGAM3723 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3723 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3723 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52087] VGAM3723 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3723 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3723 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3723 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3723 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[52088] The complementary binding of VGAM3723 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3723 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3723 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3723 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52089] It is appreciated that VGAM3723 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3723 host target genes. The mRNA of each one of this plurality of VGAM3723 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3723 RNA, herein designated VGAM RNA, and which when bound by VGAM3723 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3723 host target proteins.

[52090] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3723 gene, herein designated VGAM GENE, on one or more VGAM3723 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52091] It is yet further appreciated that a function of VGAM3723 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3723 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3723 correlate with, and may be deduced from, the identity of the host target genes which VGAM3723 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[52092] Nucleotide sequences of the VGAM3723 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3723 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3723 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3723 are further described hereinbelow with reference to Table 1.

[52093] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3723 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52094] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3724 (VGAM3724) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52095] VGAM3724 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3724 was detected is described hereinabove with reference to Figs. 2–8.

[52096] VGAM3724 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cactus virus X.

VGAM3724 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52097] VGAM3724 gene, herein designated VGAM GENE, encodes a VGAM3724 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3724 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3724 precursor RNA is designated SEQ ID:84112, and is provided hereinbelow with reference to the sequence listing part.

[52098] VGAM3724 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3724 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52099] An enzyme complex designated DICER COMPLEX, dices the VGAM3724 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3724 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3724 RNA is designated SEQ ID:84113, and is provided hereinbelow with reference to the sequence listing part.

[52100] VGAM3724 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3724 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3724 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[52101] VGAM3724 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3724 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3724 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3724 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3724 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52102] The complementary binding of VGAM3724 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3724 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3724 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3724 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52103] It is appreciated that VGAM3724 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3724 host target genes. The mRNA of each one of this plurality of VGAM3724 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3724 RNA, herein designated VGAM RNA, and which when bound by VGAM3724 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3724 host target proteins.

[52104] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3724 gene, herein designated VGAM GENE, on one

or more VGAM3724 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52105] It is yet further appreciated that a function of VGAM3724 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3724 include diagnosis, prevention and treatment of viral infection by Cactus virus X. Specific functions, and accordingly utilities, of VGAM3724 correlate with, and may be deduced from, the identity of the host target genes which VGAM3724 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52106] Nucleotide sequences of the VGAM3724 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3724 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3724 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3724 are further described hereinbelow with reference to Table 1.

[52107] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3724 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52108] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3725 (VGAM3725) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52109] VGAM3725 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3725 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[52110] VGAM3725 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3725 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52111] VGAM3725 gene, herein designated VGAM GENE, encodes a VGAM3725 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3725 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3725 precursor RNA is designated SEQ ID:84132, and is provided hereinbelow with reference to the sequence listing part.

[52112] VGAM3725 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3725 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52113] An enzyme complex designated DICER COMPLEX, dices the VGAM3725 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3725 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3725 RNA is designated SEQ ID:84133, and is provided hereinbelow with reference to the sequence listing part.

[52114] VGAM3725 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3725 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3725 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52115] VGAM3725 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3725 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3725 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3725 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3725 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52116] The complementary binding of VGAM3725 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3725 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3725 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3725 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52117] It is appreciated that VGAM3725 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3725 host target genes. The mRNA of each one of this plurality of VGAM3725 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3725 RNA, herein designated VGAM RNA, and which when bound by VGAM3725 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3725 host target proteins.

[52118] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3725 gene, herein designated VGAM GENE, on one or more VGAM3725 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52119] It is yet further appreciated that a function of VGAM3725 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3725 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3725 correlate with, and may be deduced from, the identity of the host target genes which VGAM3725 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52120] Nucleotide sequences of the VGAM3725 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3725 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3725 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3725 are further described hereinbelow with reference to Table 1.

[52121] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3725 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52122] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3726 (VGAM3726) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52123] VGAM3726 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3726 was detected is described hereinabove with reference to Figs. 2-8.

[52124] VGAM3726 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Swinepox virus.

VGAM3726 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52125] VGAM3726 gene, herein designated VGAM GENE, encodes a VGAM3726 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3726 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3726 precursor RNA is designated SEQ ID:84162, and is provided hereinbelow with reference to the sequence listing part.

[52126] VGAM3726 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3726 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[52127] An enzyme complex designated DICER COMPLEX, dices the VGAM3726 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3726 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3726 RNA is designated SEQ ID:84163, and is provided hereinbelow with reference to the sequence listing part.

[52128] VGAM3726 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3726 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3726 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52129] VGAM3726 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3726 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3726 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3726 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3726 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52130] The complementary binding of VGAM3726 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3726 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3726 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3726 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52131] It is appreciated that VGAM3726 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3726 host target genes. The mRNA of each one of this plurality of VGAM3726 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3726 RNA, herein designated VGAM RNA, and which when bound by VGAM3726 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3726 host target proteins.

[52132] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3726 gene, herein designated VGAM GENE, on one or more VGAM3726 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52133] It is yet further appreciated that a function of VGAM3726 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3726 include diagnosis, prevention and treatment of viral infection by Swinepox virus. Specific functions, and accordingly utilities, of VGAM3726 correlate with, and may be deduced from, the identity of the host target genes which VGAM3726 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52134] Nucleotide sequences of the VGAM3726 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3726 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3726 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3726 are further described hereinbelow with reference to Table 1.

[52135] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3726 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52136] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3727 (VGAM3727) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52137] VGAM3727 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3727 was detected is described hereinabove with reference to Figs. 2-8.

[52138] VGAM3727 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Equine herpesvirus 1. VGAM3727 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52139] VGAM3727 gene, herein designated VGAM GENE, encodes a VGAM3727 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3727 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3727 precursor RNA is designated SEQ ID:84170, and is provided hereinbelow with reference to the sequence listing part.

[52140] VGAM3727 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3727 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52141] An enzyme complex designated DICER COMPLEX, dices the VGAM3727 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3727 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3727 RNA is designated SEQ ID:84171, and is provided hereinbelow with reference to the sequence listing part.

[52142] VGAM3727 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3727 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3727 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52143] VGAM3727 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3727 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3727 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3727 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3727 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52144] The complementary binding of VGAM3727 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3727 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3727 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3727 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52145] It is appreciated that VGAM3727 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3727 host target genes. The mRNA of each one of this plurality of VGAM3727 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3727 RNA, herein designated VGAM RNA, and which when bound by VGAM3727 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3727 host target proteins.

[52146] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3727 gene, herein designated VGAM GENE, on one or more VGAM3727 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52147] It is yet further appreciated that a function of VGAM3727 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3727 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3727 correlate with, and may be deduced from, the identity of the host target genes which VGAM3727 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52148] Nucleotide sequences of the VGAM3727 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3727 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3727 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3727 are further described hereinbelow with reference to Table 1.

[52149] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3727 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52150] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3728 (VGAM3728) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52151] VGAM3728 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3728 was detected is described hereinabove with reference to Figs. 2-8.

[52152] VGAM3728 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 1.

VGAM3728 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52153] VGAM3728 gene, herein designated VGAM GENE, encodes a VGAM3728 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3728 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3728 precursor RNA is designated SEQ ID:84181, and is provided hereinbelow with reference to the sequence listing part.

[52154] VGAM3728 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3728 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52155] An enzyme complex designated DICER COMPLEX, dices

the VGAM3728 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3728 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3728 RNA is designated SEQ ID:84182, and is provided hereinbelow with reference to the sequence listing part.

[52156] VGAM3728 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3728 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3728 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52157] VGAM3728 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3728 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3728 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3728 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3728 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52158] The complementary binding of VGAM3728 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3728 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3728 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3728 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52159] It is appreciated that VGAM3728 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3728 host target genes. The mRNA of each one of this plurality of VGAM3728 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3728 RNA, herein designated VGAM RNA, and which when bound by VGAM3728 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3728 host target proteins.

[52160] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3728 gene, herein designated VGAM GENE, on one or more VGAM3728 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52161] It is yet further appreciated that a function of VGAM3728 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3728 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3728 correlate with, and may be deduced from, the identity of the host target genes which VGAM3728 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52162] Nucleotide sequences of the VGAM3728 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3728 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3728 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3728 are further described hereinbelow with reference to Table 1.

[52163] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3728 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52164] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3729 (VGAM3729) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52165] VGAM3729 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3729 was detected is described hereinabove with reference to Figs. 2-8.

[52166] VGAM3729 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Zucchini yellow mosaic virus. VGAM3729 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52167] VGAM3729 gene, herein designated VGAM GENE, encodes a VGAM3729 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3729 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3729 precursor RNA is designated SEQ ID:84211, and is provided hereinbelow with reference to the sequence listing part.

[52168] VGAM3729 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3729 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52169] An enzyme complex designated DICER COMPLEX, dices the VGAM3729 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3729 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3729 RNA is designated SEQ ID:84212, and is provided hereinbelow with reference to the sequence listing part.

[52170] VGAM3729 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3729 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3729 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52171] VGAM3729 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3729 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3729 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3729 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3729 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52172] The complementary binding of VGAM3729 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3729 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3729

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3729 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52173] It is appreciated that VGAM3729 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3729 host target genes. The mRNA of each one of this plurality of VGAM3729 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3729 RNA, herein designated VGAM RNA, and which when bound by VGAM3729 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3729 host target proteins.

[52174] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3729 gene, herein designated VGAM GENE, on one or more VGAM3729 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52175] It is yet further appreciated that a function of VGAM3729 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3729 include diagnosis, prevention and treatment of viral infection by Zucchini yellow mosaic virus. Specific functions, and accordingly utilities, of VGAM3729 correlate with, and may be deduced from, the identity of the host target genes which VGAM3729 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52176] Nucleotide sequences of the VGAM3729 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3729 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3729 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3729 are further described hereinbelow with reference to Table 1.

[52177] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3729 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52178] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3730 (VGAM3730) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52179] VGAM3730 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3730 was detected is described hereinabove with reference to Figs. 2-8.

[52180] VGAM3730 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3730 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in

the human genome.

[52181] VGAM3730 gene, herein designated VGAM GENE, encodes a VGAM3730 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3730 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3730 precursor RNA is designated SEQ ID:84234, and is provided hereinbelow with reference to the sequence listing part.

[52182] VGAM3730 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3730 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52183] An enzyme complex designated DICER COMPLEX, dices the VGAM3730 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3730 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3730 RNA is designated SEQ ID:84235, and is provided hereinbelow with reference to the sequence listing part.

[52184] VGAM3730 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3730 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3730 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52185] VGAM3730 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3730 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3730 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3730 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3730 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52186] The complementary binding of VGAM3730 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3730 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3730 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3730 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52187] It is appreciated that VGAM3730 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3730 host target genes. The mRNA of each one of this plurality of VGAM3730 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3730 RNA, herein designated VGAM RNA, and which when bound by VGAM3730 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3730 host target proteins.

[52188] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3730 gene, herein designated VGAM GENE, on one or more VGAM3730 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52189] It is yet further appreciated that a function of VGAM3730 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3730 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3730 correlate with, and may be deduced from, the identity of the host target genes which VGAM3730 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52190] Nucleotide sequences of the VGAM3730 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3730 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3730 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3730 are further

described hereinbelow with reference to Table 1.

[52191] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3730 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52192] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3731 (VGAM3731) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52193] VGAM3731 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3731 was detected is described hereinabove with reference to Figs. 2-8.

[52194] VGAM3731 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 3. VGAM3731 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52195] VGAM3731 gene, herein designated VGAM GENE, encodes a VGAM3731 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3731 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3731 precursor RNA is designated SEQ ID:84242, and is provided hereinbelow with reference to the sequence listing part.

[52196] VGAM3731 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3731 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52197] An enzyme complex designated DICER COMPLEX, dices the VGAM3731 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3731 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3731 RNA is designated SEQ ID:84243, and is provided hereinbelow with reference to the sequence listing part.

[52198] VGAM3731 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3731 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3731 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52199] VGAM3731 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3731 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3731 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3731 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3731 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52200] The complementary binding of VGAM3731 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3731 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3731 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3731 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52201] It is appreciated that VGAM3731 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3731 host target genes. The mRNA of each one of this plurality of VGAM3731 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3731 RNA, herein designated VGAM RNA, and which when bound by VGAM3731 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3731 host target proteins.

[52202] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3731 gene, herein designated VGAM GENE, on one or more VGAM3731 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52203] It is yet further appreciated that a function of VGAM3731 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3731 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3731 correlate with, and may be deduced from, the identity of the host target genes which VGAM3731 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52204] Nucleotide sequences of the VGAM3731 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3731 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3731 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3731 are further described hereinbelow with reference to Table 1.

[52205] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3731 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52206] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3732 (VGAM3732) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52207] VGAM3732 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3732 was detected is described hereinabove with reference to Figs. 2-8.

[52208] VGAM3732 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Respiratory syncytial virus. VGAM3732 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52209] VGAM3732 gene, herein designated VGAM GENE, encodes

a VGAM3732 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3732 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3732 precursor RNA is designated SEQ ID:84258, and is provided hereinbelow with reference to the sequence listing part.

[52210] VGAM3732 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3732 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52211] An enzyme complex designated DICER COMPLEX, dices the VGAM3732 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3732 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3732 RNA is designated SEQ ID:84259, and is provided hereinbelow with reference to the sequence listing part.

[52212] VGAM3732 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3732 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3732 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52213] VGAM3732 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3732 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3732 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3732 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3732 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52214] The complementary binding of VGAM3732 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3732 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3732 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3732 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[52215] It is appreciated that VGAM3732 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3732 host target genes. The mRNA of each one of this plurality of VGAM3732 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3732 RNA, herein designated VGAM RNA, and which when bound by VGAM3732 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3732 host target proteins.

[52216] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3732 gene, herein designated VGAM GENE, on one or more VGAM3732 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52217] It is yet further appreciated that a function of VGAM3732 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3732 include diagnosis, prevention and treatment of viral infection by Respiratory syncytial virus. Specific functions, and accordingly utilities, of VGAM3732 correlate with, and may be deduced from, the identity of the host target genes which VGAM3732 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52218] Nucleotide sequences of the VGAM3732 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3732 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3732 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3732 are further described hereinbelow with reference to Table 1.

[52219] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3732 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52220] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3733 (VGAM3733) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52221] VGAM3733 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3733 was detected is described hereinabove with reference to Figs. 2-8.

[52222] VGAM3733 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3733 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52223] VGAM3733 gene, herein designated VGAM GENE, encodes a VGAM3733 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3733 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3733 precursor RNA is designated SEQ ID:84270, and is provided hereinbelow with reference to the sequence listing part.

[52224] VGAM3733 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3733 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52225] An enzyme complex designated DICER COMPLEX, dices the VGAM3733 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3733 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3733 RNA is designated SEQ ID:84271, and is provided hereinbelow with reference to the sequence listing part.

[52226] VGAM3733 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3733 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3733 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52227] VGAM3733 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3733 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3733 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3733 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3733 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52228] The complementary binding of VGAM3733 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3733 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3733 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3733 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52229] It is appreciated that VGAM3733 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3733 host target genes. The mRNA of each one of this plurality of VGAM3733 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3733 RNA, herein designated VGAM RNA, and which when bound by VGAM3733 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3733 host target proteins.

[52230] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3733 gene, herein designated VGAM GENE, on one or more VGAM3733 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52231] It is yet further appreciated that a function of VGAM3733 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3733 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3733 correlate with, and may be deduced from, the identity of the host target genes which VGAM3733 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52232] Nucleotide sequences of the VGAM3733 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3733 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3733 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3733 are further described hereinbelow with reference to Table 1.

[52233] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3733 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52234] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3734 (VGAM3734) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52235] VGAM3734 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3734 was detected is described hereinabove with reference to Figs. 2-8.

[52236] VGAM3734 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3734 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52237] VGAM3734 gene, herein designated VGAM GENE, encodes a VGAM3734 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3734 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3734 precursor RNA is designated SEQ ID:84277, and is provided hereinbelow with reference to the sequence listing part.

[52238] VGAM3734 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3734 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52239] An enzyme complex designated DICER COMPLEX, dices the VGAM3734 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3734 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3734 RNA is designated SEQ ID:84278, and is provided hereinbelow with reference to the sequence listing part.

[52240] VGAM3734 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3734 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3734 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52241] VGAM3734 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3734 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3734 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3734 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3734 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52242] The complementary binding of VGAM3734 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3734 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3734 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3734 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52243] It is appreciated that VGAM3734 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3734 host target genes. The mRNA of each one of this plurality of VGAM3734 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3734 RNA, herein designated VGAM RNA, and which when bound by VGAM3734 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3734 host target proteins.

[52244] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3734 gene, herein designated VGAM GENE, on one or more VGAM3734 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52245] It is yet further appreciated that a function of VGAM3734 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3734 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3734 correlate with, and may be deduced from, the identity of the host target genes which VGAM3734 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52246] Nucleotide sequences of the VGAM3734 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3734 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3734 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3734 are further described hereinbelow with reference to Table 1.

[52247] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3734 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52248] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3735 (VGAM3735) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52249] VGAM3735 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3735 was detected is described hereinabove with reference to Figs. 2–8.

[52250] VGAM3735 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus.

VGAM3735 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52251] VGAM3735 gene, herein designated VGAM GENE, encodes a VGAM3735 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3735 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3735 precursor RNA is designated SEQ ID:84287, and is provided hereinbelow with reference to the sequence listing part.

[52252] VGAM3735 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3735 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52253] An enzyme complex designated DICER COMPLEX, dices the VGAM3735 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3735 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3735 RNA is designated SEQ ID:84288, and is provided hereinbelow with reference to the sequence listing part.

[52254] VGAM3735 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3735 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3735 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52255] VGAM3735 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3735 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3735 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3735 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3735 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52256] The complementary binding of VGAM3735 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3735 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3735 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3735 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52257] It is appreciated that VGAM3735 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3735 host target genes. The mRNA of each one of this plurality of VGAM3735 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3735 RNA, herein designated VGAM RNA, and which when bound by VGAM3735 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3735 host target proteins.

[52258] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3735 gene, herein designated VGAM GENE, on one or more VGAM3735 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[52259] It is yet further appreciated that a function of VGAM3735 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3735 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3735 correlate with, and may be deduced from, the identity of the host target genes which VGAM3735 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52260] Nucleotide sequences of the VGAM3735 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3735 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3735 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3735 are further described hereinbelow with reference to Table 1.

[52261] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3735 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52262] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3736 (VGAM3736) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52263] VGAM3736 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3736 was detected is described hereinabove with reference to Figs. 2-8.

[52264] VGAM3736 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3736 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52265] VGAM3736 gene, herein designated VGAM GENE, encodes a VGAM3736 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3736 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3736 precursor RNA is designated SEQ ID:84291, and is provided hereinbelow with reference to the sequence listing part.

[52266] VGAM3736 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3736 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52267] An enzyme complex designated DICER COMPLEX, dices the VGAM3736 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3736 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide se-

quence of VGAM3736 RNA is designated SEQ ID:66795, and is provided hereinbelow with reference to the sequence listing part.

[52268] VGAM3736 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3736 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3736 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52269] VGAM3736 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3736 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3736 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3736 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3736 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52270] The complementary binding of VGAM3736 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3736 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3736 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3736 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52271] It is appreciated that VGAM3736 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3736 host target genes. The mRNA of

each one of this plurality of VGAM3736 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3736 RNA, herein designated VGAM RNA, and which when bound by VGAM3736 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3736 host target proteins.

[52272] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3736 gene, herein designated VGAM GENE, on one or more VGAM3736 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[52273] It is yet further appreciated that a function of VGAM3736 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3736 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3736 correlate with, and may be deduced from, the identity of the host target genes which VGAM3736 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52274] Nucleotide sequences of the VGAM3736 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3736 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3736 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3736 are further described hereinbelow with reference to Table 1.

[52275] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3736 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[52276] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3737 (VGAM3737) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52277] VGAM3737 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3737 was detected is described hereinabove with reference to Figs. 2–8.

[52278] VGAM3737 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3737 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52279] VGAM3737 gene, herein designated VGAM GENE, encodes a VGAM3737 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3737 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3737 precursor RNA is designated SEQ ID:84292, and is provided hereinbelow with reference to the sequence listing part.

[52280] VGAM3737 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3737 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52281] An enzyme complex designated DICER COMPLEX, dices the VGAM3737 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3737 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3737 RNA is designated SEQ ID:84293,

and is provided hereinbelow with reference to the sequence listing part.

[52282] VGAM3737 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3737 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3737 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52283] VGAM3737 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3737 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3737 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3737 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3737 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52284] The complementary binding of VGAM3737 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3737 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3737 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3737 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52285] It is appreciated that VGAM3737 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3737 host target genes. The mRNA of each one of this plurality of VGAM3737 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3737 RNA, herein designated VGAM RNA, and which when bound by VGAM3737 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3737 host target proteins.

[52286] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3737 gene, herein designated VGAM GENE, on one or more VGAM3737 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52287] It is yet further appreciated that a function of VGAM3737 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3737 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3737 correlate with, and may be deduced from, the identity of the host target genes which VGAM3737 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52288] Nucleotide sequences of the VGAM3737 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3737 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3737 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3737 are further described hereinbelow with reference to Table 1.

[52289] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3737 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52290] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3738 (VGAM3738) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52291] VGAM3738 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3738 was detected is described hereinabove with reference to Figs. 2–8.

[52292] VGAM3738 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3738 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52293] VGAM3738 gene, herein designated VGAM GENE, encodes a VGAM3738 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3738 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3738 precu-

sor RNA is designated SEQ ID:84321, and is provided hereinbelow with reference to the sequence listing part.

[52294] VGAM3738 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3738 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52295] An enzyme complex designated DICER COMPLEX, dices the VGAM3738 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3738 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3738 RNA is designated SEQ ID:84322, and is provided hereinbelow with reference to the se-

quence listing part.

[52296] VGAM3738 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3738 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3738 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52297] VGAM3738 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3738 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3738 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3738 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3738 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52298] The complementary binding of VGAM3738 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3738 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3738 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3738 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52299] It is appreciated that VGAM3738 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3738 host target genes. The mRNA of each one of this plurality of VGAM3738 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3738 RNA, herein designated VGAM RNA, and which when bound by VGAM3738 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3738 host target proteins.

[52300] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3738 gene, herein designated VGAM GENE, on one or more VGAM3738 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52301] It is yet further appreciated that a function of VGAM3738

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3738 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3738 correlate with, and may be deduced from, the identity of the host target genes which VGAM3738 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52302] Nucleotide sequences of the VGAM3738 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3738 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3738 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3738 are further described hereinbelow with reference to Table 1.

[52303] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3738 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52304] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3739 (VGAM3739) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52305] VGAM3739 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3739 was detected is described hereinabove with reference to Figs. 2–8.

[52306] VGAM3739 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3739 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52307] VGAM3739 gene, herein designated VGAM GENE, encodes a VGAM3739 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3739 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3739 precursor RNA is designated SEQ ID:84598, and is provided

hereinbelow with reference to the sequence listing part.

[52308] VGAM3739 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3739 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52309] An enzyme complex designated DICER COMPLEX, dices the VGAM3739 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3739 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3739 RNA is designated SEQ ID:84599, and is provided hereinbelow with reference to the sequence listing part.

[52310] VGAM3739 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3739 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3739 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52311] VGAM3739 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3739 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3739 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3739 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3739 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52312] The complementary binding of VGAM3739 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3739 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3739 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3739 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52313] It is appreciated that VGAM3739 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3739 host target genes. The mRNA of each one of this plurality of VGAM3739 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3739 RNA, herein designated VGAM RNA, and which when bound by VGAM3739 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3739 host target proteins.

[52314] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3739 gene, herein designated VGAM GENE, on one or more VGAM3739 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52315] It is yet further appreciated that a function of VGAM3739 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3739 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3739 correlate with, and may be deduced from, the identity of the host target genes which VGAM3739 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52316] Nucleotide sequences of the VGAM3739 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3739 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3739 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3739 are further described hereinbelow with reference to Table 1.

[52317] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3739 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52318] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3740 (VGAM3740) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52319] VGAM3740 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3740 was detected is described hereinabove with reference to Figs. 2–8.

[52320] VGAM3740 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus D. VGAM3740 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52321] VGAM3740 gene, herein designated VGAM GENE, encodes a VGAM3740 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3740 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3740 precursor RNA is designated SEQ ID:84612, and is provided hereinbelow with reference to the sequence listing part.

[52322] VGAM3740 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3740 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52323] An enzyme complex designated DICER COMPLEX, dices the VGAM3740 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3740 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3740 RNA is designated SEQ ID:84613, and is provided hereinbelow with reference to the sequence listing part.

[52324] VGAM3740 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3740 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3740 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52325] VGAM3740 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3740 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3740 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3740 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3740 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52326] The complementary binding of VGAM3740 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3740 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3740 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3740 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52327] It is appreciated that VGAM3740 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3740 host target genes. The mRNA of each one of this plurality of VGAM3740 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3740 RNA, herein designated VGAM

RNA, and which when bound by VGAM3740 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3740 host target proteins.

[52328] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3740 gene, herein designated VGAM GENE, on one or more VGAM3740 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52329] It is yet further appreciated that a function of VGAM3740 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3740 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus D. Specific functions, and accordingly utilities, of VGAM3740 correlate with, and may be deduced from, the identity of the host target genes which VGAM3740 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52330] Nucleotide sequences of the VGAM3740 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3740 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3740 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3740 are further described hereinbelow with reference to Table 1.

[52331] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3740 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52332] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3741 (VGAM3741) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52333] VGAM3741 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3741 was detected is described hereinabove with reference to Figs. 2-8.

[52334] VGAM3741 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Myxoma virus. VGAM3741 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52335] VGAM3741 gene, herein designated VGAM GENE, encodes a VGAM3741 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3741 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3741 precursor RNA is designated SEQ ID:84639, and is provided hereinbelow with reference to the sequence listing part.

[52336] VGAM3741 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3741 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52337] An enzyme complex designated DICER COMPLEX, dices the VGAM3741 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3741 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3741 RNA is designated SEQ ID:84640, and is provided hereinbelow with reference to the sequence listing part.

[52338] VGAM3741 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3741 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3741 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52339] VGAM3741 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3741 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3741 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3741 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3741 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52340] The complementary binding of VGAM3741 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3741 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3741 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3741 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52341] It is appreciated that VGAM3741 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3741 host target genes. The mRNA of each one of this plurality of VGAM3741 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3741 RNA, herein designated VGAM RNA, and which when bound by VGAM3741 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3741 host target proteins.

[52342] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3741 gene, herein designated VGAM GENE, on one or more VGAM3741 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52343] It is yet further appreciated that a function of VGAM3741 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3741 include diagnosis, prevention and

treatment of viral infection by Myxoma virus. Specific functions, and accordingly utilities, of VGAM3741 correlate with, and may be deduced from, the identity of the host target genes which VGAM3741 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52344] Nucleotide sequences of the VGAM3741 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3741 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3741 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3741 are further described hereinbelow with reference to Table 1.

[52345] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3741 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52346] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3742 (VGAM3742) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52347] VGAM3742 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3742 was detected is described hereinabove with reference to Figs. 2–8.

[52348] VGAM3742 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 1. VGAM3742 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52349] VGAM3742 gene, herein designated VGAM GENE, encodes a VGAM3742 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3742 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3742 precursor RNA is designated SEQ ID:84654, and is provided hereinbelow with reference to the sequence listing part.

[52350] VGAM3742 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3742 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52351] An enzyme complex designated DICER COMPLEX, dices the VGAM3742 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3742 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3742 RNA is designated SEQ ID:84655, and is provided hereinbelow with reference to the sequence listing part.

[52352] VGAM3742 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3742 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3742 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52353] VGAM3742 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3742 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3742 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3742 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3742 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52354] The complementary binding of VGAM3742 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3742 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3742 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3742 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52355] It is appreciated that VGAM3742 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3742 host target genes. The mRNA of each one of this plurality of VGAM3742 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3742 RNA, herein designated VGAM RNA, and which when bound by VGAM3742 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3742 host target proteins.

[52356] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3742 gene, herein designated VGAM GENE, on one or more VGAM3742 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52357] It is yet further appreciated that a function of VGAM3742 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3742 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 1. Spe-

cific functions, and accordingly utilities, of VGAM3742 correlate with, and may be deduced from, the identity of the host target genes which VGAM3742 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52358] Nucleotide sequences of the VGAM3742 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3742 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3742 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3742 are further described hereinbelow with reference to Table 1.

[52359] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3742 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52360] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3743 (VGAM3743) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[52361] VGAM3743 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3743 was detected is described hereinabove with reference to Figs. 2–8.

[52362] VGAM3743 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 1. VGAM3743 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52363] VGAM3743 gene, herein designated VGAM GENE, encodes a VGAM3743 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3743 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3743 precursor RNA is designated SEQ ID:84667, and is provided hereinbelow with reference to the sequence listing part.

[52364] VGAM3743 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3743 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52365] An enzyme complex designated DICER COMPLEX, dices the VGAM3743 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3743 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3743 RNA is designated SEQ ID:84668, and is provided hereinbelow with reference to the sequence listing part.

[52366] VGAM3743 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3743 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3743 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52367] VGAM3743 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3743 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3743 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3743 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3743 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52368] The complementary binding of VGAM3743 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3743 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3743 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3743 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52369] It is appreciated that VGAM3743 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3743 host target genes. The mRNA of each one of this plurality of VGAM3743 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3743 RNA, herein designated VGAM RNA, and which when bound by VGAM3743 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3743 host target proteins.

[52370] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3743 gene, herein designated VGAM GENE, on one or more VGAM3743 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52371] It is yet further appreciated that a function of VGAM3743 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3743 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3743

correlate with, and may be deduced from, the identity of the host target genes which VGAM3743 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52372] Nucleotide sequences of the VGAM3743 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3743 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3743 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3743 are further described hereinbelow with reference to Table 1.

[52373] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3743 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52374] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3744 (VGAM3744) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[52375] VGAM3744 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3744 was detected is described hereinabove with reference to Figs. 2–8.

[52376] VGAM3744 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Okra enation virus. VGAM3744 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52377] VGAM3744 gene, herein designated VGAM GENE, encodes a VGAM3744 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3744 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3744 precursor RNA is designated SEQ ID:84746, and is provided hereinbelow with reference to the sequence listing part.

[52378] VGAM3744 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3744 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52379] An enzyme complex designated DICER COMPLEX, dices the VGAM3744 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3744 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3744 RNA is designated SEQ ID:84747, and is provided hereinbelow with reference to the sequence listing part.

[52380] VGAM3744 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3744 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3744 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52381] VGAM3744 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3744 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3744 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3744 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3744 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52382] The complementary binding of VGAM3744 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3744 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3744 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3744 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52383] It is appreciated that VGAM3744 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3744 host target genes. The mRNA of each one of this plurality of VGAM3744 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3744 RNA, herein designated VGAM RNA, and which when bound by VGAM3744 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3744 host target proteins.

[52384] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3744 gene, herein designated VGAM GENE, on one or more VGAM3744 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52385] It is yet further appreciated that a function of VGAM3744 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3744 include diagnosis, prevention and treatment of viral infection by Okra enation virus. Specific functions, and accordingly utilities, of VGAM3744 correlate with, and may be deduced from, the identity of the

host target genes which VGAM3744 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52386] Nucleotide sequences of the VGAM3744 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3744 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3744 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3744 are further described hereinbelow with reference to Table 1.

[52387] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3744 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52388] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3745 (VGAM3745) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52389] VGAM3745 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3745 was detected is described hereinabove with reference to Figs. 2–8.

[52390] VGAM3745 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3745 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52391] VGAM3745 gene, herein designated VGAM GENE, encodes a VGAM3745 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3745 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3745 precursor RNA is designated SEQ ID:84759, and is provided hereinbelow with reference to the sequence listing part.

[52392] VGAM3745 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3745 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52393] An enzyme complex designated DICER COMPLEX, dices the VGAM3745 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3745 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3745 RNA is designated SEQ ID:84760, and is provided hereinbelow with reference to the sequence listing part.

[52394] VGAM3745 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3745 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3745 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52395] VGAM3745 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3745 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3745 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3745 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3745 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52396] The complementary binding of VGAM3745 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3745 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3745 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3745 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52397] It is appreciated that VGAM3745 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3745 host target genes. The mRNA of each one of this plurality of VGAM3745 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3745 RNA, herein designated VGAM RNA, and which when bound by VGAM3745 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3745 host target proteins.

[52398] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3745 gene, herein designated VGAM GENE, on one or more VGAM3745 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52399] It is yet further appreciated that a function of VGAM3745 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3745 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3745 correlate with, and may be deduced from, the identity of the host target genes which

VGAM3745 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52400] Nucleotide sequences of the VGAM3745 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3745 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3745 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3745 are further described hereinbelow with reference to Table 1.

[52401] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3745 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52402] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3746 (VGAM3746) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52403] VGAM3746 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3746 was detected is described hereinabove with reference to Figs. 2–8.

[52404] VGAM3746 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Wheat streak mosaic virus. VGAM3746 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52405] VGAM3746 gene, herein designated VGAM GENE, encodes a VGAM3746 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3746 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3746 precursor RNA is designated SEQ ID:84777, and is provided hereinbelow with reference to the sequence listing part.

[52406] VGAM3746 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3746 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52407] An enzyme complex designated DICER COMPLEX, dices the VGAM3746 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3746 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3746 RNA is designated SEQ ID:84778, and is provided hereinbelow with reference to the sequence listing part.

[52408] VGAM3746 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3746 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3746 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52409] VGAM3746 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3746 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3746 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3746 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3746 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[52410] The complementary binding of VGAM3746 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3746 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3746 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3746 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52411] It is appreciated that VGAM3746 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3746 host target genes. The mRNA of each one of this plurality of VGAM3746 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3746 RNA, herein designated VGAM RNA, and which when bound by VGAM3746 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3746 host target proteins.

[52412] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3746 gene, herein designated VGAM GENE, on one or more VGAM3746 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52413] It is yet further appreciated that a function of VGAM3746 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3746 include diagnosis, prevention and treatment of viral infection by Wheat streak mosaic virus. Specific functions, and accordingly utilities, of VGAM3746 correlate with, and may be deduced from, the identity of the host target genes which VGAM3746 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[52414] Nucleotide sequences of the VGAM3746 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3746 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3746 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3746 are further described hereinbelow with reference to Table 1.

[52415] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3746 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52416] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3747 (VGAM3747) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52417] VGAM3747 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3747 was detected is described hereinabove with reference to Figs. 2–8.

[52418] VGAM3747 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sendai virus. VGAM3747 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52419] VGAM3747 gene, herein designated VGAM GENE, encodes a VGAM3747 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3747 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3747 precursor RNA is designated SEQ ID:84805, and is provided hereinbelow with reference to the sequence listing part.

[52420] VGAM3747 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3747 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52421] An enzyme complex designated DICER COMPLEX, dices the VGAM3747 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3747 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3747 RNA is designated SEQ ID:84806, and is provided hereinbelow with reference to the sequence listing part.

[52422] VGAM3747 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3747 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3747 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52423] VGAM3747 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3747 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3747 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3747 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3747 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52424] The complementary binding of VGAM3747 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3747 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3747 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3747 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52425] It is appreciated that VGAM3747 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3747 host target genes. The mRNA of each one of this plurality of VGAM3747 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3747 RNA, herein designated VGAM RNA, and which when bound by VGAM3747 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3747 host target proteins.

[52426] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3747 gene, herein designated VGAM GENE, on one or more VGAM3747 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52427] It is yet further appreciated that a function of VGAM3747 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3747 include diagnosis, prevention and treatment of viral infection by Sendai virus. Specific functions, and accordingly utilities, of VGAM3747 correlate with, and may be deduced from, the identity of the host target genes which VGAM3747 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52428] Nucleotide sequences of the VGAM3747 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3747 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3747 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3747 are further described hereinbelow with reference to Table 1.

[52429] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3747 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52430] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3748 (VGAM3748) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52431] VGAM3748 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3748 was detected is described hereinabove with reference to Figs. 2-8.

[52432] VGAM3748 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus D.

VGAM3748 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52433] VGAM3748 gene, herein designated VGAM GENE, encodes a VGAM3748 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3748 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3748 precursor RNA is designated SEQ ID:84825, and is provided hereinbelow with reference to the sequence listing part.

[52434] VGAM3748 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3748 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[52435] An enzyme complex designated DICER COMPLEX, dices the VGAM3748 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3748 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3748 RNA is designated SEQ ID:84826, and is provided hereinbelow with reference to the sequence listing part.

[52436] VGAM3748 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3748 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3748 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52437] VGAM3748 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3748 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3748 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3748 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3748 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52438] The complementary binding of VGAM3748 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3748 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3748 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3748 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52439] It is appreciated that VGAM3748 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3748 host target genes. The mRNA of each one of this plurality of VGAM3748 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3748 RNA, herein designated VGAM RNA, and which when bound by VGAM3748 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3748 host target proteins.

[52440] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3748 gene, herein designated VGAM GENE, on one or more VGAM3748 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52441] It is yet further appreciated that a function of VGAM3748 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3748 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus D. Specific functions, and accordingly utilities, of VGAM3748 correlate with, and may be deduced from, the identity of the host target genes which VGAM3748 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52442] Nucleotide sequences of the VGAM3748 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3748 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3748 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3748 are further described hereinbelow with reference to Table 1.

[52443] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3748 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52444] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3749 (VGAM3749) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52445] VGAM3749 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3749 was detected is described hereinabove with reference to Figs. 2-8.

[52446] VGAM3749 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Paramecium bursaria
Chlorella virus 1. VGAM3749 host target gene, herein
designated VGAM HOST TARGET GENE, is a human gene
contained in the human genome.

[52447] VGAM3749 gene, herein designated VGAM GENE, encodes
a VGAM3749 precursor RNA, herein designated VGAM
PRECURSOR RNA. Similar to other miRNA genes, and un-
like most ordinary genes, VGAM3749 precursor RNA,
herein designated VGAM PRECURSOR RNA, does not en-
code a protein. A nucleotide sequence identical or highly
similar to the nucleotide sequence of VGAM3749 precu-
sor RNA is designated SEQ ID:84834, and is provided
hereinbelow with reference to the sequence listing part.

[52448] VGAM3749 precursor RNA, herein designated VGAM PRE-
CURSOR RNA, folds onto itself, forming VGAM3749 folded
precursor RNA, herein designated VGAM FOLDED PRECUR-
SOR RNA, which has a two-dimensional hairpin structure.
As is well known in the art, this hairpin structure, is typi-
cal of RNA encoded by miRNA genes, and is due to the
fact that the nucleotide sequence of the first half of the
RNA encoded by a miRNA gene is an accurate or partial
inversed-reversed sequence of the nucleotide sequence of
the second half thereof.

[52449] An enzyme complex designated DICER COMPLEX, dices the VGAM3749 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3749 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3749 RNA is designated SEQ ID:84835, and is provided hereinbelow with reference to the sequence listing part.

[52450] VGAM3749 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3749 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3749 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52451] VGAM3749 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3749 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3749 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3749 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3749 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52452] The complementary binding of VGAM3749 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3749 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3749 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3749 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52453] It is appreciated that VGAM3749 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3749 host target genes. The mRNA of each one of this plurality of VGAM3749 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3749 RNA, herein designated VGAM RNA, and which when bound by VGAM3749 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3749 host target proteins.

[52454] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3749 gene, herein designated VGAM GENE, on one or more VGAM3749 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52455] It is yet further appreciated that a function of VGAM3749 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3749 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3749 correlate with, and may be deduced from, the identity of the host target genes which VGAM3749 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52456] Nucleotide sequences of the VGAM3749 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3749 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3749 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3749 are further described hereinbelow with reference to Table 1.

[52457] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3749 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52458] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3750 (VGAM3750) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52459] VGAM3750 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3750 was detected is described hereinabove with reference to Figs. 2-8.

[52460] VGAM3750 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria

Chlorella virus 1. VGAM3750 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52461] VGAM3750 gene, herein designated VGAM GENE, encodes a VGAM3750 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3750 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3750 precursor RNA is designated SEQ ID:84842, and is provided hereinbelow with reference to the sequence listing part.

[52462] VGAM3750 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3750 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52463] An enzyme complex designated DICER COMPLEX, dices

the VGAM3750 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3750 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3750 RNA is designated SEQ ID:84843, and is provided hereinbelow with reference to the sequence listing part.

[52464] VGAM3750 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3750 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3750 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52465] VGAM3750 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3750 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3750 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3750 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3750 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52466] The complementary binding of VGAM3750 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3750 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3750 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3750 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52467] It is appreciated that VGAM3750 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3750 host target genes. The mRNA of each one of this plurality of VGAM3750 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3750 RNA, herein designated VGAM RNA, and which when bound by VGAM3750 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3750 host target proteins.

[52468] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3750 gene, herein designated VGAM GENE, on one or more VGAM3750 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52469] It is yet further appreciated that a function of VGAM3750 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3750 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3750 correlate with, and may be deduced from, the identity of the host target genes which VGAM3750 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52470] Nucleotide sequences of the VGAM3750 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3750 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3750 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3750 are further described hereinbelow with reference to Table 1.

[52471] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3750 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52472] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3751 (VGAM3751) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52473] VGAM3751 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3751 was detected is described hereinabove with reference to Figs. 2-8.

[52474] VGAM3751 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Infectious spleen and kidney necrosis virus. VGAM3751 host target gene, herein

designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52475] VGAM3751 gene, herein designated VGAM GENE, encodes a VGAM3751 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3751 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3751 precursor RNA is designated SEQ ID:84845, and is provided hereinbelow with reference to the sequence listing part.

[52476] VGAM3751 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3751 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52477] An enzyme complex designated DICER COMPLEX, dices the VGAM3751 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3751 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3751 RNA is designated SEQ ID:84846, and is provided hereinbelow with reference to the sequence listing part.

[52478] VGAM3751 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3751 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3751 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52479] VGAM3751 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3751 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3751 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3751 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3751 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52480] The complementary binding of VGAM3751 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3751 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3751

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3751 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52481] It is appreciated that VGAM3751 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3751 host target genes. The mRNA of each one of this plurality of VGAM3751 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3751 RNA, herein designated VGAM RNA, and which when bound by VGAM3751 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3751 host target proteins.

[52482] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3751 gene, herein designated VGAM GENE, on one or more VGAM3751 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52483] It is yet further appreciated that a function of VGAM3751 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3751 include diagnosis, prevention and treatment of viral infection by Infectious spleen and kidney necrosis virus. Specific functions, and accordingly utilities, of VGAM3751 correlate with, and may be deduced from, the identity of the host target genes which VGAM3751 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52484] Nucleotide sequences of the VGAM3751 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3751 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3751 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3751 are further described hereinbelow with reference to Table 1.

[52485] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3751 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52486] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3752 (VGAM3752) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52487] VGAM3752 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3752 was detected is described hereinabove with reference to Figs. 2-8.

[52488] VGAM3752 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3752 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[52489] VGAM3752 gene, herein designated VGAM GENE, encodes a VGAM3752 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3752 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3752 precursor RNA is designated SEQ ID:84865, and is provided hereinbelow with reference to the sequence listing part.

[52490] VGAM3752 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3752 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52491] An enzyme complex designated DICER COMPLEX, dices the VGAM3752 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3752 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3752 RNA is designated SEQ ID:84866, and is provided hereinbelow with reference to the sequence listing part.

[52492] VGAM3752 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3752 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3752 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52493] VGAM3752 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3752 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3752 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3752 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3752 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52494] The complementary binding of VGAM3752 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3752 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3752 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3752 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52495] It is appreciated that VGAM3752 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3752 host target genes. The mRNA of each one of this plurality of VGAM3752 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3752 RNA, herein designated VGAM RNA, and which when bound by VGAM3752 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3752 host target proteins.

[52496] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3752 gene, herein designated VGAM GENE, on one or more VGAM3752 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52497] It is yet further appreciated that a function of VGAM3752 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3752 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3752 correlate with, and may be deduced from, the identity of the host target genes which VGAM3752 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52498] Nucleotide sequences of the VGAM3752 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3752 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3752 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3752 are further

described hereinbelow with reference to Table 1.

[52499] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3752 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52500] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3753 (VGAM3753) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52501] VGAM3753 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3753 was detected is described hereinabove with reference to Figs. 2-8.

[52502] VGAM3753 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 4. VGAM3753 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52503] VGAM3753 gene, herein designated VGAM GENE, encodes a VGAM3753 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3753 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3753 precursor RNA is designated SEQ ID:84873, and is provided hereinbelow with reference to the sequence listing part.

[52504] VGAM3753 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3753 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52505] An enzyme complex designated DICER COMPLEX, dices the VGAM3753 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3753 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3753 RNA is designated SEQ ID:84874, and is provided hereinbelow with reference to the sequence listing part.

[52506] VGAM3753 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3753 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3753 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52507] VGAM3753 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3753 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3753 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3753 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3753 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52508] The complementary binding of VGAM3753 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3753 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3753 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3753 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52509] It is appreciated that VGAM3753 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3753 host target genes. The mRNA of each one of this plurality of VGAM3753 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3753 RNA, herein designated VGAM RNA, and which when bound by VGAM3753 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3753 host target proteins.

[52510] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3753 gene, herein designated VGAM GENE, on one or more VGAM3753 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52511] It is yet further appreciated that a function of VGAM3753 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3753 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3753 correlate with, and may be deduced from, the identity of the host target genes which VGAM3753 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52512] Nucleotide sequences of the VGAM3753 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3753 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3753 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3753 are further described hereinbelow with reference to Table 1.

[52513] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3753 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52514] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3754 (VGAM3754) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52515] VGAM3754 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3754 was detected is described hereinabove with reference to Figs. 2-8.

[52516] VGAM3754 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3754 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52517] VGAM3754 gene, herein designated VGAM GENE, encodes

a VGAM3754 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3754 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3754 precursor RNA is designated SEQ ID:84881, and is provided hereinbelow with reference to the sequence listing part.

[52518] VGAM3754 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3754 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52519] An enzyme complex designated DICER COMPLEX, dices the VGAM3754 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3754 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3754 RNA is designated SEQ ID:84882, and is provided hereinbelow with reference to the sequence listing part.

[52520] VGAM3754 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3754 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3754 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52521] VGAM3754 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3754 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3754 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3754 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3754 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52522] The complementary binding of VGAM3754 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3754 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3754 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3754 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[52523] It is appreciated that VGAM3754 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3754 host target genes. The mRNA of each one of this plurality of VGAM3754 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3754 RNA, herein designated VGAM RNA, and which when bound by VGAM3754 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3754 host target proteins.

[52524] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3754 gene, herein designated VGAM GENE, on one or more VGAM3754 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52525] It is yet further appreciated that a function of VGAM3754 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3754 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3754 correlate with, and may be deduced from, the identity of the host target genes which VGAM3754 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52526] Nucleotide sequences of the VGAM3754 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3754 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3754 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3754 are further described hereinbelow with reference to Table 1.

[52527] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3754 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52528] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3755 (VGAM3755) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52529] VGAM3755 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3755 was detected is described hereinabove with reference to Figs. 2-8.

[52530] VGAM3755 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3755 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52531] VGAM3755 gene, herein designated VGAM GENE, encodes a VGAM3755 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3755 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3755 precursor RNA is designated SEQ ID:84900, and is provided hereinbelow with reference to the sequence listing part.

[52532] VGAM3755 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3755 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52533] An enzyme complex designated DICER COMPLEX, dices the VGAM3755 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3755 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3755 RNA is designated SEQ ID:84901, and is provided hereinbelow with reference to the sequence listing part.

[52534] VGAM3755 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3755 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3755 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52535] VGAM3755 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3755 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3755 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3755 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3755 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52536] The complementary binding of VGAM3755 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3755 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3755 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3755 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52537] It is appreciated that VGAM3755 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3755 host target genes. The mRNA of each one of this plurality of VGAM3755 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3755 RNA, herein designated VGAM RNA, and which when bound by VGAM3755 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3755 host target proteins.

[52538] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3755 gene, herein designated VGAM GENE, on one or more VGAM3755 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52539] It is yet further appreciated that a function of VGAM3755 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3755 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3755 correlate with, and may be deduced from, the identity of the host target genes which VGAM3755 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52540] Nucleotide sequences of the VGAM3755 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3755 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3755 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3755 are further described hereinbelow with reference to Table 1.

[52541] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3755 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52542] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3756 (VGAM3756) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52543] VGAM3756 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3756 was detected is described hereinabove with reference to Figs. 2-8.

[52544] VGAM3756 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Theilovirus. VGAM3756 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52545] VGAM3756 gene, herein designated VGAM GENE, encodes a VGAM3756 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3756 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3756 precursor RNA is designated SEQ ID:84917, and is provided hereinbelow with reference to the sequence listing part.

[52546] VGAM3756 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3756 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52547] An enzyme complex designated DICER COMPLEX, dices the VGAM3756 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3756 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3756 RNA is designated SEQ ID:84918, and is provided hereinbelow with reference to the sequence listing part.

[52548] VGAM3756 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3756 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3756 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52549] VGAM3756 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3756 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3756 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3756 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3756 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52550] The complementary binding of VGAM3756 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3756 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3756 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3756 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52551] It is appreciated that VGAM3756 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3756 host target genes. The mRNA of each one of this plurality of VGAM3756 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3756 RNA, herein designated VGAM RNA, and which when bound by VGAM3756 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3756 host target proteins.

[52552] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3756 gene, herein designated VGAM GENE, on one or more VGAM3756 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[52553] It is yet further appreciated that a function of VGAM3756 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3756 include diagnosis, prevention and treatment of viral infection by Theilovirus. Specific functions, and accordingly utilities, of VGAM3756 correlate with, and may be deduced from, the identity of the host target genes which VGAM3756 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52554] Nucleotide sequences of the VGAM3756 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3756 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3756 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3756 are further described hereinbelow with reference to Table 1.

[52555] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3756 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52556] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3757 (VGAM3757) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52557] VGAM3757 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3757 was detected is described hereinabove with reference to Figs. 2-8.

[52558] VGAM3757 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Newcastle disease virus. VGAM3757 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52559] VGAM3757 gene, herein designated VGAM GENE, encodes a VGAM3757 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3757 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3757 precursor RNA is designated SEQ ID:84920, and is provided hereinbelow with reference to the sequence listing part.

[52560] VGAM3757 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3757 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52561] An enzyme complex designated DICER COMPLEX, dices the VGAM3757 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3757 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3757 RNA is designated SEQ ID:84921, and is provided hereinbelow with reference to the sequence listing part.

[52562] VGAM3757 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3757 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3757 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52563] VGAM3757 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3757 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3757 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3757 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3757 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52564] The complementary binding of VGAM3757 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3757 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3757 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3757 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52565] It is appreciated that VGAM3757 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3757 host target genes. The mRNA of

each one of this plurality of VGAM3757 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3757 RNA, herein designated VGAM RNA, and which when bound by VGAM3757 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3757 host target proteins.

[52566] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3757 gene, herein designated VGAM GENE, on one or more VGAM3757 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[52567] It is yet further appreciated that a function of VGAM3757 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3757 include diagnosis, prevention and treatment of viral infection by Newcastle disease virus. Specific functions, and accordingly utilities, of VGAM3757 correlate with, and may be deduced from, the identity of the host target genes which VGAM3757 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52568] Nucleotide sequences of the VGAM3757 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3757 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3757 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3757 are further described hereinbelow with reference to Table 1.

[52569] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3757 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[52570] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3758 (VGAM3758) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52571] VGAM3758 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3758 was detected is described hereinabove with reference to Figs. 2–8.

[52572] VGAM3758 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3758 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52573] VGAM3758 gene, herein designated VGAM GENE, encodes a VGAM3758 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3758 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3758 precursor RNA is designated SEQ ID:84924, and is provided hereinbelow with reference to the sequence listing part.

[52574] VGAM3758 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3758 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52575] An enzyme complex designated DICER COMPLEX, dices the VGAM3758 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3758 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3758 RNA is designated SEQ ID:84925,

and is provided hereinbelow with reference to the sequence listing part.

[52576] VGAM3758 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3758 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3758 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52577] VGAM3758 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3758 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3758 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3758 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3758 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52578] The complementary binding of VGAM3758 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3758 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3758 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3758 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52579] It is appreciated that VGAM3758 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3758 host target genes. The mRNA of each one of this plurality of VGAM3758 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3758 RNA, herein designated VGAM RNA, and which when bound by VGAM3758 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3758 host target proteins.

[52580] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3758 gene, herein designated VGAM GENE, on one or more VGAM3758 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52581] It is yet further appreciated that a function of VGAM3758 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3758 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3758 correlate with, and may be deduced from, the identity of the host target genes which VGAM3758 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52582] Nucleotide sequences of the VGAM3758 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3758 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3758 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3758 are further described hereinbelow with reference to Table 1.

[52583] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3758 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52584] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3759 (VGAM3759) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52585] VGAM3759 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3759 was detected is described hereinabove with reference to Figs. 2–8.

[52586] VGAM3759 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sulfolobus virus SIRV-2. VGAM3759 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52587] VGAM3759 gene, herein designated VGAM GENE, encodes a VGAM3759 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3759 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3759 precu-

sor RNA is designated SEQ ID:84939, and is provided hereinbelow with reference to the sequence listing part.

[52588] VGAM3759 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3759 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52589] An enzyme complex designated DICER COMPLEX, dices the VGAM3759 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3759 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3759 RNA is designated SEQ ID:84940, and is provided hereinbelow with reference to the se-

quence listing part.

[52590] VGAM3759 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3759 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3759 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52591] VGAM3759 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3759 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3759 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3759 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3759 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52592] The complementary binding of VGAM3759 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3759 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3759 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3759 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52593] It is appreciated that VGAM3759 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3759 host target genes. The mRNA of each one of this plurality of VGAM3759 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3759 RNA, herein designated VGAM RNA, and which when bound by VGAM3759 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3759 host target proteins.

[52594] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3759 gene, herein designated VGAM GENE, on one or more VGAM3759 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52595] It is yet further appreciated that a function of VGAM3759

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3759 include diagnosis, prevention and treatment of viral infection by Sulfolobus virus SIRV-2. Specific functions, and accordingly utilities, of VGAM3759 correlate with, and may be deduced from, the identity of the host target genes which VGAM3759 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52596] Nucleotide sequences of the VGAM3759 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3759 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3759 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3759 are further described hereinbelow with reference to Table 1.

[52597] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3759 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52598] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3760 (VGAM3760) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52599] VGAM3760 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3760 was detected is described hereinabove with reference to Figs. 2–8.

[52600] VGAM3760 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3760 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52601] VGAM3760 gene, herein designated VGAM GENE, encodes a VGAM3760 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3760 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3760 precursor RNA is designated SEQ ID:84943, and is provided

hereinbelow with reference to the sequence listing part.

[52602] VGAM3760 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3760 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52603] An enzyme complex designated DICER COMPLEX, dices the VGAM3760 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3760 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3760 RNA is designated SEQ ID:84944, and is provided hereinbelow with reference to the sequence listing part.

[52604] VGAM3760 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3760 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3760 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52605] VGAM3760 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3760 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3760 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3760 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3760 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52606] The complementary binding of VGAM3760 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3760 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3760 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3760 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52607] It is appreciated that VGAM3760 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3760 host target genes. The mRNA of each one of this plurality of VGAM3760 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3760 RNA, herein designated VGAM RNA, and which when bound by VGAM3760 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3760 host target proteins.

[52608] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3760 gene, herein designated VGAM GENE, on one or more VGAM3760 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52609] It is yet further appreciated that a function of VGAM3760 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3760 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3760 correlate with, and may be deduced from, the identity of the host target genes which VGAM3760 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52610] Nucleotide sequences of the VGAM3760 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3760 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3760 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3760 are further described hereinbelow with reference to Table 1.

[52611] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3760 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52612] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3761 (VGAM3761) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52613] VGAM3761 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3761 was detected is described hereinabove with reference to Figs. 2–8.

[52614] VGAM3761 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Amsacta moorei entomopoxvirus. VGAM3761 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52615] VGAM3761 gene, herein designated VGAM GENE, encodes a VGAM3761 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3761 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3761 precursor RNA is designated SEQ ID:84998, and is provided hereinbelow with reference to the sequence listing part.

[52616] VGAM3761 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3761 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52617] An enzyme complex designated DICER COMPLEX, dices the VGAM3761 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3761 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3761 RNA is designated SEQ ID:84999, and is provided hereinbelow with reference to the sequence listing part.

[52618] VGAM3761 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3761 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3761 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52619] VGAM3761 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3761 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3761 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3761 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3761 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52620] The complementary binding of VGAM3761 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3761 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3761 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3761 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52621] It is appreciated that VGAM3761 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3761 host target genes. The mRNA of each one of this plurality of VGAM3761 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3761 RNA, herein designated VGAM

RNA, and which when bound by VGAM3761 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3761 host target proteins.

[52622] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3761 gene, herein designated VGAM GENE, on one or more VGAM3761 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52623] It is yet further appreciated that a function of VGAM3761 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3761 include diagnosis, prevention and treatment of viral infection by Amsacta moorei entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3761 correlate with, and may be deduced from, the identity of the host target genes which VGAM3761 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52624] Nucleotide sequences of the VGAM3761 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3761 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3761 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3761 are further described hereinbelow with reference to Table 1.

[52625] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3761 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52626] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3762 (VGAM3762) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52627] VGAM3762 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3762 was detected is described hereinabove with reference to Figs. 2–8.

[52628] VGAM3762 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3762 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52629] VGAM3762 gene, herein designated VGAM GENE, encodes a VGAM3762 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3762 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3762 precursor RNA is designated SEQ ID:85008, and is provided hereinbelow with reference to the sequence listing part.

[52630] VGAM3762 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3762 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52631] An enzyme complex designated DICER COMPLEX, dices the VGAM3762 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3762 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3762 RNA is designated SEQ ID:85009, and is provided hereinbelow with reference to the sequence listing part.

[52632] VGAM3762 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3762 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3762 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52633] VGAM3762 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3762 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3762 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3762 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3762 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52634] The complementary binding of VGAM3762 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3762 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3762 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3762 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52635] It is appreciated that VGAM3762 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3762 host target genes. The mRNA of each one of this plurality of VGAM3762 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3762 RNA, herein designated VGAM RNA, and which when bound by VGAM3762 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3762 host target proteins.

[52636] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3762 gene, herein designated VGAM GENE, on one or more VGAM3762 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52637] It is yet further appreciated that a function of VGAM3762 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3762 include diagnosis, prevention and

treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3762 correlate with, and may be deduced from, the identity of the host target genes which VGAM3762 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52638] Nucleotide sequences of the VGAM3762 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3762 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3762 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3762 are further described hereinbelow with reference to Table 1.

[52639] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3762 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52640] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3763 (VGAM3763) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52641] VGAM3763 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3763 was detected is described hereinabove with reference to Figs. 2–8.

[52642] VGAM3763 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3763 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52643] VGAM3763 gene, herein designated VGAM GENE, encodes a VGAM3763 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3763 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3763 precursor RNA is designated SEQ ID:85055, and is provided hereinbelow with reference to the sequence listing part.

[52644] VGAM3763 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3763 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52645] An enzyme complex designated DICER COMPLEX, dices the VGAM3763 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3763 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3763 RNA is designated SEQ ID:85056, and is provided hereinbelow with reference to the sequence listing part.

[52646] VGAM3763 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3763 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3763 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52647] VGAM3763 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3763 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3763 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3763 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3763 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52648] The complementary binding of VGAM3763 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3763 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3763 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3763 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52649] It is appreciated that VGAM3763 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3763 host target genes. The mRNA of each one of this plurality of VGAM3763 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3763 RNA, herein designated VGAM RNA, and which when bound by VGAM3763 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3763 host target proteins.

[52650] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3763 gene, herein designated VGAM GENE, on one or more VGAM3763 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52651] It is yet further appreciated that a function of VGAM3763 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3763 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1.

Specific functions, and accordingly utilities, of VGAM3763 correlate with, and may be deduced from, the identity of the host target genes which VGAM3763 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52652] Nucleotide sequences of the VGAM3763 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3763 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3763 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3763 are further described hereinbelow with reference to Table 1.

[52653] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3763 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52654] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3764 (VGAM3764) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[52655] VGAM3764 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3764 was detected is described hereinabove with reference to Figs. 2–8.

[52656] VGAM3764 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human parainfluenza virus 1 strain Washington/1964. VGAM3764 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52657] VGAM3764 gene, herein designated VGAM GENE, encodes a VGAM3764 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3764 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3764 precursor RNA is designated SEQ ID:85065, and is provided hereinbelow with reference to the sequence listing part.

[52658] VGAM3764 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3764 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52659] An enzyme complex designated DICER COMPLEX, dices the VGAM3764 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3764 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3764 RNA is designated SEQ ID:85066, and is provided hereinbelow with reference to the sequence listing part.

[52660] VGAM3764 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3764 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3764 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52661] VGAM3764 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3764 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3764 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3764 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3764 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52662] The complementary binding of VGAM3764 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3764 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3764 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3764 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52663] It is appreciated that VGAM3764 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3764 host target genes. The mRNA of each one of this plurality of VGAM3764 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3764 RNA, herein designated VGAM RNA, and which when bound by VGAM3764 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3764 host target proteins.

[52664] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3764 gene, herein designated VGAM GENE, on one or more VGAM3764 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52665] It is yet further appreciated that a function of VGAM3764 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3764 include diagnosis, prevention and treatment of viral infection by Human parainfluenza virus 1 strain Washington/1964. Specific functions, and accord-

ingly utilities, of VGAM3764 correlate with, and may be deduced from, the identity of the host target genes which VGAM3764 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52666] Nucleotide sequences of the VGAM3764 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3764 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3764 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3764 are further described hereinbelow with reference to Table 1.

[52667] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3764 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52668] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3765 (VGAM3765) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[52669] VGAM3765 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3765 was detected is described hereinabove with reference to Figs. 2–8.

[52670] VGAM3765 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3765 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52671] VGAM3765 gene, herein designated VGAM GENE, encodes a VGAM3765 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3765 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3765 precursor RNA is designated SEQ ID:85070, and is provided hereinbelow with reference to the sequence listing part.

[52672] VGAM3765 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3765 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52673] An enzyme complex designated DICER COMPLEX, dices the VGAM3765 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3765 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3765 RNA is designated SEQ ID:85071, and is provided hereinbelow with reference to the sequence listing part.

[52674] VGAM3765 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3765 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3765 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52675] VGAM3765 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3765 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3765 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3765 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3765 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52676] The complementary binding of VGAM3765 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3765 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3765 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3765 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52677] It is appreciated that VGAM3765 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3765 host target genes. The mRNA of each one of this plurality of VGAM3765 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3765 RNA, herein designated VGAM RNA, and which when bound by VGAM3765 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3765 host target proteins.

[52678] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3765 gene, herein designated VGAM GENE, on one or more VGAM3765 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52679] It is yet further appreciated that a function of VGAM3765 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3765 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3765 correlate with, and may be deduced

from, the identity of the host target genes which VGAM3765 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52680] Nucleotide sequences of the VGAM3765 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3765 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3765 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3765 are further described hereinbelow with reference to Table 1.

[52681] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3765 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52682] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3766 (VGAM3766) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52683] VGAM3766 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3766 was detected is described hereinabove with reference to Figs. 2–8.

[52684] VGAM3766 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cucumber mosaic virus. VGAM3766 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52685] VGAM3766 gene, herein designated VGAM GENE, encodes a VGAM3766 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3766 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3766 precursor RNA is designated SEQ ID:85085, and is provided hereinbelow with reference to the sequence listing part.

[52686] VGAM3766 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3766 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52687] An enzyme complex designated DICER COMPLEX, dices the VGAM3766 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3766 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3766 RNA is designated SEQ ID:85086, and is provided hereinbelow with reference to the sequence listing part.

[52688] VGAM3766 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3766 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3766 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52689] VGAM3766 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3766 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3766 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3766 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3766 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52690] The complementary binding of VGAM3766 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3766 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3766 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3766 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52691] It is appreciated that VGAM3766 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3766 host target genes. The mRNA of each one of this plurality of VGAM3766 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3766 RNA, herein designated VGAM RNA, and which when bound by VGAM3766 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3766 host target proteins.

[52692] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3766 gene, herein designated VGAM GENE, on one or more VGAM3766 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52693] It is yet further appreciated that a function of VGAM3766 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3766 include diagnosis, prevention and treatment of viral infection by Cucumber mosaic virus. Specific functions, and accordingly utilities, of VGAM3766 correlate with, and may be deduced from, the identity of the host target genes which VGAM3766 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[52694] Nucleotide sequences of the VGAM3766 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3766 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3766 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3766 are further described hereinbelow with reference to Table 1.

[52695] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3766 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52696] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3767 (VGAM3767) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52697] VGAM3767 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3767 was detected is described hereinabove with reference to Figs. 2–8.

[52698] VGAM3767 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Pepper ringspot virus. VGAM3767 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52699] VGAM3767 gene, herein designated VGAM GENE, encodes a VGAM3767 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3767 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3767 precursor RNA is designated SEQ ID:85089, and is provided hereinbelow with reference to the sequence listing part.

[52700] VGAM3767 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3767 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52701] An enzyme complex designated DICER COMPLEX, dices the VGAM3767 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3767 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3767 RNA is designated SEQ ID:85090, and is provided hereinbelow with reference to the sequence listing part.

[52702] VGAM3767 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3767 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3767 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52703] VGAM3767 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3767 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3767 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3767 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3767 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[52704] The complementary binding of VGAM3767 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3767 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3767 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3767 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52705] It is appreciated that VGAM3767 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3767 host target genes. The mRNA of each one of this plurality of VGAM3767 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3767 RNA, herein designated VGAM RNA, and which when bound by VGAM3767 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3767 host target proteins.

[52706] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3767 gene, herein designated VGAM GENE, on one or more VGAM3767 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52707] It is yet further appreciated that a function of VGAM3767 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3767 include diagnosis, prevention and treatment of viral infection by Pepper ringspot virus. Specific functions, and accordingly utilities, of VGAM3767 correlate with, and may be deduced from, the identity of the host target genes which VGAM3767 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[52708] Nucleotide sequences of the VGAM3767 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3767 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3767 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3767 are further described hereinbelow with reference to Table 1.

[52709] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3767 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52710] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3768 (VGAM3768) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52711] VGAM3768 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3768 was detected is described hereinabove with reference to Figs. 2–8.

[52712] VGAM3768 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3768 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52713] VGAM3768 gene, herein designated VGAM GENE, encodes a VGAM3768 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3768 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3768 precursor RNA is designated SEQ ID:85094, and is provided hereinbelow with reference to the sequence listing part.

[52714] VGAM3768 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3768 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52715] An enzyme complex designated DICER COMPLEX, dices the VGAM3768 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3768 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3768 RNA is designated SEQ ID:85095, and is provided hereinbelow with reference to the sequence listing part.

[52716] VGAM3768 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3768 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3768 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[52717] VGAM3768 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3768 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3768 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3768 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3768 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52718] The complementary binding of VGAM3768 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3768 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3768 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3768 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52719] It is appreciated that VGAM3768 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3768 host target genes. The mRNA of each one of this plurality of VGAM3768 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3768 RNA, herein designated VGAM RNA, and which when bound by VGAM3768 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3768 host target proteins.

[52720] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3768 gene, herein designated VGAM GENE, on one

or more VGAM3768 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52721] It is yet further appreciated that a function of VGAM3768 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3768 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3768 correlate with, and may be deduced from, the identity of the host target genes which VGAM3768 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52722] Nucleotide sequences of the VGAM3768 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3768 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3768 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3768 are further described hereinbelow with reference to Table 1.

[52723] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3768 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52724] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3769 (VGAM3769) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52725] VGAM3769 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3769 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[52726] VGAM3769 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice black streaked dwarf virus. VGAM3769 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52727] VGAM3769 gene, herein designated VGAM GENE, encodes a VGAM3769 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3769 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3769 precursor RNA is designated SEQ ID:85097, and is provided hereinbelow with reference to the sequence listing part.

[52728] VGAM3769 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3769 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52729] An enzyme complex designated DICER COMPLEX, dices the VGAM3769 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3769 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 75%) nucleotide sequence of VGAM3769 RNA is designated SEQ ID:85098, and is provided hereinbelow with reference to the sequence listing part.

[52730] VGAM3769 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3769 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3769 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52731] VGAM3769 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3769 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3769 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3769 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3769 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52732] The complementary binding of VGAM3769 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3769 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3769 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3769 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52733] It is appreciated that VGAM3769 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3769 host target genes. The mRNA of each one of this plurality of VGAM3769 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3769 RNA, herein designated VGAM RNA, and which when bound by VGAM3769 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3769 host target proteins.

[52734] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3769 gene, herein designated VGAM GENE, on one or more VGAM3769 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52735] It is yet further appreciated that a function of VGAM3769 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3769 include diagnosis, prevention and treatment of viral infection by Rice black streaked dwarf virus. Specific functions, and accordingly utilities, of VGAM3769 correlate with, and may be deduced from, the identity of the host target genes which VGAM3769 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52736] Nucleotide sequences of the VGAM3769 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3769 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3769 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3769 are further described hereinbelow with reference to Table 1.

[52737] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3769 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52738] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3770 (VGAM3770) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52739] VGAM3770 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3770 was detected is described hereinabove with reference to Figs. 2-8.

[52740] VGAM3770 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3770 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52741] VGAM3770 gene, herein designated VGAM GENE, encodes a VGAM3770 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3770 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3770 precursor RNA is designated SEQ ID:85125, and is provided hereinbelow with reference to the sequence listing part.

[52742] VGAM3770 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3770 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[52743] An enzyme complex designated DICER COMPLEX, dices the VGAM3770 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3770 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3770 RNA is designated SEQ ID:85126, and is provided hereinbelow with reference to the sequence listing part.

[52744] VGAM3770 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3770 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3770 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52745] VGAM3770 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3770 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3770 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3770 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3770 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52746] The complementary binding of VGAM3770 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3770 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3770 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3770 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52747] It is appreciated that VGAM3770 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3770 host target genes. The mRNA of each one of this plurality of VGAM3770 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3770 RNA, herein designated VGAM RNA, and which when bound by VGAM3770 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3770 host target proteins.

[52748] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3770 gene, herein designated VGAM GENE, on one or more VGAM3770 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52749] It is yet further appreciated that a function of VGAM3770 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3770 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3770 correlate with, and may be deduced from, the identity of the host target genes which VGAM3770 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52750] Nucleotide sequences of the VGAM3770 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3770 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3770 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3770 are further described hereinbelow with reference to Table 1.

[52751] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3770 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52752] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3771 (VGAM3771) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52753] VGAM3771 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3771 was detected is described hereinabove with reference to Figs. 2-8.

[52754] VGAM3771 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Cercopithecine herpesvirus 7. VGAM3771 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52755] VGAM3771 gene, herein designated VGAM GENE, encodes a VGAM3771 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3771 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3771 precursor RNA is designated SEQ ID:85133, and is provided hereinbelow with reference to the sequence listing part.

[52756] VGAM3771 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3771 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52757] An enzyme complex designated DICER COMPLEX, dices the VGAM3771 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3771 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3771 RNA is designated SEQ ID:85134, and is provided hereinbelow with reference to the sequence listing part.

[52758] VGAM3771 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3771 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3771 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52759] VGAM3771 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3771 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3771 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3771 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3771 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52760] The complementary binding of VGAM3771 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3771 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3771 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3771 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52761] It is appreciated that VGAM3771 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3771 host target genes. The mRNA of each one of this plurality of VGAM3771 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3771 RNA, herein designated VGAM RNA, and which when bound by VGAM3771 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3771 host target proteins.

[52762] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3771 gene, herein designated VGAM GENE, on one or more VGAM3771 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52763] It is yet further appreciated that a function of VGAM3771 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3771 include diagnosis, prevention and treatment of viral infection by Cercopithecine herpesvirus 7. Specific functions, and accordingly utilities, of VGAM3771 correlate with, and may be deduced from, the identity of the host target genes which VGAM3771 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52764] Nucleotide sequences of the VGAM3771 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3771 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3771 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3771 are further described hereinbelow with reference to Table 1.

[52765] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3771 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52766] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3772 (VGAM3772) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52767] VGAM3772 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3772 was detected is described hereinabove with reference to Figs. 2-8.

[52768] VGAM3772 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1.

VGAM3772 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52769] VGAM3772 gene, herein designated VGAM GENE, encodes a VGAM3772 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3772 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3772 precursor RNA is designated SEQ ID:85138, and is provided hereinbelow with reference to the sequence listing part.

[52770] VGAM3772 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3772 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52771] An enzyme complex designated DICER COMPLEX, dices

the VGAM3772 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3772 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3772 RNA is designated SEQ ID:85139, and is provided hereinbelow with reference to the sequence listing part.

[52772] VGAM3772 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3772 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3772 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52773] VGAM3772 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3772 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3772 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3772 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3772 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52774] The complementary binding of VGAM3772 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3772 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3772 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3772 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52775] It is appreciated that VGAM3772 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3772 host target genes. The mRNA of each one of this plurality of VGAM3772 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3772 RNA, herein designated VGAM RNA, and which when bound by VGAM3772 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3772 host target proteins.

[52776] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3772 gene, herein designated VGAM GENE, on one or more VGAM3772 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52777] It is yet further appreciated that a function of VGAM3772 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3772 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3772 correlate with, and may be deduced from, the identity of the host target genes which VGAM3772 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52778] Nucleotide sequences of the VGAM3772 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3772 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3772 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3772 are further described hereinbelow with reference to Table 1.

[52779] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3772 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52780] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3773 (VGAM3773) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52781] VGAM3773 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3773 was detected is described hereinabove with reference to Figs. 2-8.

[52782] VGAM3773 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3773 host target gene, herein designated

VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52783] VGAM3773 gene, herein designated VGAM GENE, encodes a VGAM3773 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3773 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3773 precursor RNA is designated SEQ ID:85280, and is provided hereinbelow with reference to the sequence listing part.

[52784] VGAM3773 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3773 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52785] An enzyme complex designated DICER COMPLEX, dices the VGAM3773 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3773 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3773 RNA is designated SEQ ID:85281, and is provided hereinbelow with reference to the sequence listing part.

[52786] VGAM3773 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3773 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3773 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52787] VGAM3773 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3773 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3773 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3773 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3773 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52788] The complementary binding of VGAM3773 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3773 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3773

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3773 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52789] It is appreciated that VGAM3773 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3773 host target genes. The mRNA of each one of this plurality of VGAM3773 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3773 RNA, herein designated VGAM RNA, and which when bound by VGAM3773 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3773 host target proteins.

[52790] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3773 gene, herein designated VGAM GENE, on one or more VGAM3773 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52791] It is yet further appreciated that a function of VGAM3773 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3773 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3773 correlate with, and may be deduced from, the identity of the host target genes which VGAM3773 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52792] Nucleotide sequences of the VGAM3773 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3773 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3773 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3773 are further described hereinbelow with reference to Table 1.

[52793] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3773 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52794] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3774 (VGAM3774) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52795] VGAM3774 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3774 was detected is described hereinabove with reference to Figs. 2-8.

[52796] VGAM3774 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3774 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene

contained in the human genome.

[52797] VGAM3774 gene, herein designated VGAM GENE, encodes a VGAM3774 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3774 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3774 precursor RNA is designated SEQ ID:85319, and is provided hereinbelow with reference to the sequence listing part.

[52798] VGAM3774 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3774 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52799] An enzyme complex designated DICER COMPLEX, dices the VGAM3774 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3774 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3774 RNA is designated SEQ ID:85320, and is provided hereinbelow with reference to the sequence listing part.

[52800] VGAM3774 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3774 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3774 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52801] VGAM3774 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3774 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3774 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3774 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3774 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52802] The complementary binding of VGAM3774 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3774 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3774 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3774 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52803] It is appreciated that VGAM3774 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3774 host target genes. The mRNA of each one of this plurality of VGAM3774 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3774 RNA, herein designated VGAM RNA, and which when bound by VGAM3774 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3774 host target proteins.

[52804] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3774 gene, herein designated VGAM GENE, on one or more VGAM3774 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52805] It is yet further appreciated that a function of VGAM3774 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3774 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3774 correlate with, and may be deduced from, the identity of the host target genes which VGAM3774 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52806] Nucleotide sequences of the VGAM3774 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3774 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3774 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3774 are further

described hereinbelow with reference to Table 1.

[52807] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3774 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52808] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3775 (VGAM3775) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52809] VGAM3775 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3775 was detected is described hereinabove with reference to Figs. 2-8.

[52810] VGAM3775 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Tupaia herpesvirus. VGAM3775 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52811] VGAM3775 gene, herein designated VGAM GENE, encodes a VGAM3775 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3775 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3775 precursor RNA is designated SEQ ID:85327, and is provided hereinbelow with reference to the sequence listing part.

[52812] VGAM3775 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3775 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52813] An enzyme complex designated DICER COMPLEX, dices the VGAM3775 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3775 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3775 RNA is designated SEQ ID:85328, and is provided hereinbelow with reference to the sequence listing part.

[52814] VGAM3775 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3775 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3775 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52815] VGAM3775 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3775 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3775 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3775 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3775 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52816] The complementary binding of VGAM3775 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3775 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3775 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3775 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52817] It is appreciated that VGAM3775 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3775 host target genes. The mRNA of each one of this plurality of VGAM3775 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3775 RNA, herein designated VGAM RNA, and which when bound by VGAM3775 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3775 host target proteins.

[52818] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3775 gene, herein designated VGAM GENE, on one or more VGAM3775 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52819] It is yet further appreciated that a function of VGAM3775 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3775 include diagnosis, prevention and treatment of viral infection by Tupaia herpesvirus. Specific functions, and accordingly utilities, of VGAM3775 correlate with, and may be deduced from, the identity of the host target genes which VGAM3775 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52820] Nucleotide sequences of the VGAM3775 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3775 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3775 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3775 are further described hereinbelow with reference to Table 1.

[52821] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3775 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52822] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3776 (VGAM3776) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52823] VGAM3776 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3776 was detected is described hereinabove with reference to Figs. 2-8.

[52824] VGAM3776 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human adenovirus F. VGAM3776 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52825] VGAM3776 gene, herein designated VGAM GENE, encodes

a VGAM3776 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3776 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3776 precursor RNA is designated SEQ ID:85335, and is provided hereinbelow with reference to the sequence listing part.

[52826] VGAM3776 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3776 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52827] An enzyme complex designated DICER COMPLEX, dices the VGAM3776 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3776 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3776 RNA is designated SEQ ID:85336, and is provided hereinbelow with reference to the sequence listing part.

[52828] VGAM3776 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3776 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3776 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52829] VGAM3776 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3776 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3776 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3776 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3776 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52830] The complementary binding of VGAM3776 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3776 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3776 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3776 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[52831] It is appreciated that VGAM3776 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3776 host target genes. The mRNA of each one of this plurality of VGAM3776 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3776 RNA, herein designated VGAM RNA, and which when bound by VGAM3776 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3776 host target proteins.

[52832] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3776 gene, herein designated VGAM GENE, on one or more VGAM3776 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52833] It is yet further appreciated that a function of VGAM3776 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3776 include diagnosis, prevention and treatment of viral infection by Human adenovirus F. Specific functions, and accordingly utilities, of VGAM3776 correlate with, and may be deduced from, the identity of the host target genes which VGAM3776 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52834] Nucleotide sequences of the VGAM3776 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3776 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3776 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3776 are further described hereinbelow with reference to Table 1.

[52835] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3776 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52836] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3777 (VGAM3777) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52837] VGAM3777 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3777 was detected is described hereinabove with reference to Figs. 2-8.

[52838] VGAM3777 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human parainfluenza virus 3. VGAM3777 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52839] VGAM3777 gene, herein designated VGAM GENE, encodes a VGAM3777 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3777 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3777 precursor RNA is designated SEQ ID:85340, and is provided hereinbelow with reference to the sequence listing part.

[52840] VGAM3777 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3777 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52841] An enzyme complex designated DICER COMPLEX, dices the VGAM3777 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3777 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3777 RNA is designated SEQ ID:85341, and is provided hereinbelow with reference to the sequence listing part.

[52842] VGAM3777 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3777 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3777 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52843] VGAM3777 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3777 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3777 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3777 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3777 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52844] The complementary binding of VGAM3777 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3777 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3777 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3777 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52845] It is appreciated that VGAM3777 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3777 host target genes. The mRNA of each one of this plurality of VGAM3777 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3777 RNA, herein designated VGAM RNA, and which when bound by VGAM3777 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3777 host target proteins.

[52846] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3777 gene, herein designated VGAM GENE, on one or more VGAM3777 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52847] It is yet further appreciated that a function of VGAM3777 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3777 include diagnosis, prevention and treatment of viral infection by Human parainfluenza virus 3. Specific functions, and accordingly utilities, of VGAM3777 correlate with, and may be deduced from, the identity of the host target genes which VGAM3777 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52848] Nucleotide sequences of the VGAM3777 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3777 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3777 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3777 are further described hereinbelow with reference to Table 1.

[52849] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3777 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52850] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3778 (VGAM3778) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52851] VGAM3778 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3778 was detected is described hereinabove with reference to Figs. 2-8.

[52852] VGAM3778 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ateline herpesvirus 3. VGAM3778 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52853] VGAM3778 gene, herein designated VGAM GENE, encodes a VGAM3778 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3778 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3778 precursor RNA is designated SEQ ID:85354, and is provided hereinbelow with reference to the sequence listing part.

[52854] VGAM3778 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3778 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52855] An enzyme complex designated DICER COMPLEX, dices the VGAM3778 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3778 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3778 RNA is designated SEQ ID:85355, and is provided hereinbelow with reference to the sequence listing part.

[52856] VGAM3778 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3778 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3778 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52857] VGAM3778 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3778 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3778 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3778 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3778 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52858] The complementary binding of VGAM3778 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3778 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3778 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3778 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52859] It is appreciated that VGAM3778 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3778 host target genes. The mRNA of each one of this plurality of VGAM3778 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3778 RNA, herein designated VGAM RNA, and which when bound by VGAM3778 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3778 host target proteins.

[52860] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3778 gene, herein designated VGAM GENE, on one or more VGAM3778 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52861] It is yet further appreciated that a function of VGAM3778 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3778 include diagnosis, prevention and treatment of viral infection by Ateline herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3778 correlate with, and may be deduced from, the identity of the host target genes which VGAM3778 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52862] Nucleotide sequences of the VGAM3778 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3778 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3778 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3778 are further described hereinbelow with reference to Table 1.

[52863] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3778 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52864] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3779 (VGAM3779) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52865] VGAM3779 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3779 was detected is described hereinabove with reference to Figs. 2–8.

[52866] VGAM3779 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Mice minute virus. VGAM3779 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52867] VGAM3779 gene, herein designated VGAM GENE, encodes a VGAM3779 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3779 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3779 precursor RNA is designated SEQ ID:85385, and is provided hereinbelow with reference to the sequence listing part.

[52868] VGAM3779 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3779 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52869] An enzyme complex designated DICER COMPLEX, dices the VGAM3779 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3779 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3779 RNA is designated SEQ ID:85386, and is provided hereinbelow with reference to the sequence listing part.

[52870] VGAM3779 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3779 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3779 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52871] VGAM3779 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3779 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3779 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3779 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3779 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52872] The complementary binding of VGAM3779 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3779 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3779 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3779 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52873] It is appreciated that VGAM3779 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3779 host target genes. The mRNA of each one of this plurality of VGAM3779 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3779 RNA, herein designated VGAM RNA, and which when bound by VGAM3779 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3779 host target proteins.

[52874] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3779 gene, herein designated VGAM GENE, on one or more VGAM3779 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[52875] It is yet further appreciated that a function of VGAM3779 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3779 include diagnosis, prevention and treatment of viral infection by Mice minute virus. Specific functions, and accordingly utilities, of VGAM3779 correlate with, and may be deduced from, the identity of the host target genes which VGAM3779 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52876] Nucleotide sequences of the VGAM3779 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3779 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3779 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3779 are further described hereinbelow with reference to Table 1.

[52877] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3779 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52878] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3780 (VGAM3780) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52879] VGAM3780 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3780 was detected is described hereinabove with reference to Figs. 2–8.

[52880] VGAM3780 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine adenovirus D. VGAM3780 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52881] VGAM3780 gene, herein designated VGAM GENE, encodes a VGAM3780 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3780 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3780 precursor RNA is designated SEQ ID:85395, and is provided hereinbelow with reference to the sequence listing part.

[52882] VGAM3780 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3780 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52883] An enzyme complex designated DICER COMPLEX, dices the VGAM3780 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3780 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide se-

quence of VGAM3780 RNA is designated SEQ ID:85396, and is provided hereinbelow with reference to the sequence listing part.

[52884] VGAM3780 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3780 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3780 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52885] VGAM3780 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3780 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3780 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3780 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3780 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52886] The complementary binding of VGAM3780 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3780 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3780 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3780 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52887] It is appreciated that VGAM3780 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3780 host target genes. The mRNA of

each one of this plurality of VGAM3780 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3780 RNA, herein designated VGAM RNA, and which when bound by VGAM3780 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3780 host target proteins.

[52888] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3780 gene, herein designated VGAM GENE, on one or more VGAM3780 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[52889] It is yet further appreciated that a function of VGAM3780 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3780 include diagnosis, prevention and treatment of viral infection by Bovine adenovirus D. Specific functions, and accordingly utilities, of VGAM3780 correlate with, and may be deduced from, the identity of the host target genes which VGAM3780 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52890] Nucleotide sequences of the VGAM3780 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3780 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3780 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3780 are further described hereinbelow with reference to Table 1.

[52891] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3780 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[52892] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3781 (VGAM3781) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52893] VGAM3781 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3781 was detected is described hereinabove with reference to Figs. 2–8.

[52894] VGAM3781 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus.

VGAM3781 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52895] VGAM3781 gene, herein designated VGAM GENE, encodes a VGAM3781 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3781 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3781 precursor RNA is designated SEQ ID:85402, and is provided hereinbelow with reference to the sequence listing part.

[52896] VGAM3781 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3781 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52897] An enzyme complex designated DICER COMPLEX, dices the VGAM3781 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3781 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3781 RNA is designated SEQ ID:85403,

and is provided hereinbelow with reference to the sequence listing part.

[52898] VGAM3781 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3781 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3781 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52899] VGAM3781 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3781 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3781 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3781 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3781 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52900] The complementary binding of VGAM3781 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3781 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3781 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3781 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52901] It is appreciated that VGAM3781 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3781 host target genes. The mRNA of each one of this plurality of VGAM3781 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3781 RNA, herein designated VGAM RNA, and which when bound by VGAM3781 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3781 host target proteins.

[52902] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3781 gene, herein designated VGAM GENE, on one or more VGAM3781 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52903] It is yet further appreciated that a function of VGAM3781 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3781 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3781 correlate with, and may be deduced from, the identity of the host target genes which VGAM3781 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52904] Nucleotide sequences of the VGAM3781 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3781 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3781 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3781 are further described hereinbelow with reference to Table 1.

[52905] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3781 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52906] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3782 (VGAM3782) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52907] VGAM3782 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3782 was detected is described hereinabove with reference to Figs. 2–8.

[52908] VGAM3782 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowl adenovirus D. VGAM3782 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52909] VGAM3782 gene, herein designated VGAM GENE, encodes a VGAM3782 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3782 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3782 precu-

sor RNA is designated SEQ ID:85408, and is provided hereinbelow with reference to the sequence listing part.

[52910] VGAM3782 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3782 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52911] An enzyme complex designated DICER COMPLEX, dices the VGAM3782 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3782 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3782 RNA is designated SEQ ID:85409, and is provided hereinbelow with reference to the se-

quence listing part.

[52912] VGAM3782 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3782 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3782 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52913] VGAM3782 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3782 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3782 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3782 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3782 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52914] The complementary binding of VGAM3782 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3782 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3782 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3782 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52915] It is appreciated that VGAM3782 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3782 host target genes. The mRNA of each one of this plurality of VGAM3782 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3782 RNA, herein designated VGAM RNA, and which when bound by VGAM3782 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3782 host target proteins.

[52916] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3782 gene, herein designated VGAM GENE, on one or more VGAM3782 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52917] It is yet further appreciated that a function of VGAM3782

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3782 include diagnosis, prevention and treatment of viral infection by Fowl adenovirus D. Specific functions, and accordingly utilities, of VGAM3782 correlate with, and may be deduced from, the identity of the host target genes which VGAM3782 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52918] Nucleotide sequences of the VGAM3782 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3782 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3782 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3782 are further described hereinbelow with reference to Table 1.

[52919] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3782 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52920] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3783 (VGAM3783) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52921] VGAM3783 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3783 was detected is described hereinabove with reference to Figs. 2–8.

[52922] VGAM3783 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 1. VGAM3783 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52923] VGAM3783 gene, herein designated VGAM GENE, encodes a VGAM3783 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3783 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3783 precursor RNA is designated SEQ ID:85411, and is provided

hereinbelow with reference to the sequence listing part.

[52924] VGAM3783 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3783 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52925] An enzyme complex designated DICER COMPLEX, dices the VGAM3783 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3783 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3783 RNA is designated SEQ ID:85412, and is provided hereinbelow with reference to the sequence listing part.

[52926] VGAM3783 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3783 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3783 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52927] VGAM3783 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3783 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3783 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3783 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3783 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52928] The complementary binding of VGAM3783 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3783 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3783 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3783 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52929] It is appreciated that VGAM3783 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3783 host target genes. The mRNA of each one of this plurality of VGAM3783 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3783 RNA, herein designated VGAM RNA, and which when bound by VGAM3783 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3783 host target proteins.

[52930] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3783 gene, herein designated VGAM GENE, on one or more VGAM3783 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52931] It is yet further appreciated that a function of VGAM3783 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3783 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3783 correlate with, and may be deduced from, the identity of the host target genes which VGAM3783 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52932] Nucleotide sequences of the VGAM3783 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3783 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3783 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3783 are further described hereinbelow with reference to Table 1.

[52933] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3783 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52934] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3784 (VGAM3784) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52935] VGAM3784 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3784 was detected is described hereinabove with reference to Figs. 2–8.

[52936] VGAM3784 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3784 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52937] VGAM3784 gene, herein designated VGAM GENE, encodes a VGAM3784 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3784 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3784 precursor RNA is designated SEQ ID:85566, and is provided hereinbelow with reference to the sequence listing part.

[52938] VGAM3784 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3784 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52939] An enzyme complex designated DICER COMPLEX, dices the VGAM3784 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3784 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3784 RNA is designated SEQ ID:85567, and is provided hereinbelow with reference to the sequence listing part.

[52940] VGAM3784 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3784 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3784 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52941] VGAM3784 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3784 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3784 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3784 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3784 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52942] The complementary binding of VGAM3784 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3784 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3784 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3784 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52943] It is appreciated that VGAM3784 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3784 host target genes. The mRNA of each one of this plurality of VGAM3784 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3784 RNA, herein designated VGAM

RNA, and which when bound by VGAM3784 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3784 host target proteins.

[52944] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3784 gene, herein designated VGAM GENE, on one or more VGAM3784 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52945] It is yet further appreciated that a function of VGAM3784 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3784 include diagnosis, prevention and treatment of viral infection by Mollusum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3784 correlate with, and may be deduced from, the identity of the host target genes which VGAM3784 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52946] Nucleotide sequences of the VGAM3784 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3784 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3784 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3784 are further described hereinbelow with reference to Table 1.

[52947] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3784 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52948] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3785 (VGAM3785) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52949] VGAM3785 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3785 was detected is described hereinabove with reference to Figs. 2-8.

[52950] VGAM3785 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 2. VGAM3785 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52951] VGAM3785 gene, herein designated VGAM GENE, encodes a VGAM3785 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3785 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3785 precursor RNA is designated SEQ ID:85581, and is provided hereinbelow with reference to the sequence listing part.

[52952] VGAM3785 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3785 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52953] An enzyme complex designated DICER COMPLEX, dices the VGAM3785 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3785 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3785 RNA is designated SEQ ID:85582, and is provided hereinbelow with reference to the sequence listing part.

[52954] VGAM3785 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3785 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3785 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52955] VGAM3785 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3785 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3785 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3785 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3785 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52956] The complementary binding of VGAM3785 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3785 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3785 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3785 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52957] It is appreciated that VGAM3785 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3785 host target genes. The mRNA of each one of this plurality of VGAM3785 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3785 RNA, herein designated VGAM RNA, and which when bound by VGAM3785 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3785 host target proteins.

[52958] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3785 gene, herein designated VGAM GENE, on one or more VGAM3785 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52959] It is yet further appreciated that a function of VGAM3785 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3785 include diagnosis, prevention and

treatment of viral infection by Human herpesvirus 2. Specific functions, and accordingly utilities, of VGAM3785 correlate with, and may be deduced from, the identity of the host target genes which VGAM3785 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52960] Nucleotide sequences of the VGAM3785 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3785 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3785 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3785 are further described hereinbelow with reference to Table 1.

[52961] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3785 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52962] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3786 (VGAM3786) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[52963] VGAM3786 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3786 was detected is described hereinabove with reference to Figs. 2–8.

[52964] VGAM3786 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sheeppox virus. VGAM3786 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52965] VGAM3786 gene, herein designated VGAM GENE, encodes a VGAM3786 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3786 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3786 precursor RNA is designated SEQ ID:85628, and is provided hereinbelow with reference to the sequence listing part.

[52966] VGAM3786 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3786 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52967] An enzyme complex designated DICER COMPLEX, dices the VGAM3786 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3786 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3786 RNA is designated SEQ ID:85629, and is provided hereinbelow with reference to the sequence listing part.

[52968] VGAM3786 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3786 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3786 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52969] VGAM3786 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3786 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3786 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3786 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3786 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52970] The complementary binding of VGAM3786 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3786 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3786 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3786 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52971] It is appreciated that VGAM3786 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3786 host target genes. The mRNA of each one of this plurality of VGAM3786 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3786 RNA, herein designated VGAM RNA, and which when bound by VGAM3786 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3786 host target proteins.

[52972] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3786 gene, herein designated VGAM GENE, on one or more VGAM3786 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52973] It is yet further appreciated that a function of VGAM3786 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3786 include diagnosis, prevention and treatment of viral infection by Sheeppox virus. Specific

functions, and accordingly utilities, of VGAM3786 correlate with, and may be deduced from, the identity of the host target genes which VGAM3786 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52974] Nucleotide sequences of the VGAM3786 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3786 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3786 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3786 are further described hereinbelow with reference to Table 1.

[52975] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3786 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52976] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3787 (VGAM3787) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[52977] VGAM3787 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3787 was detected is described hereinabove with reference to Figs. 2–8.

[52978] VGAM3787 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3787 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52979] VGAM3787 gene, herein designated VGAM GENE, encodes a VGAM3787 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3787 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3787 precursor RNA is designated SEQ ID:85638, and is provided hereinbelow with reference to the sequence listing part.

[52980] VGAM3787 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3787 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52981] An enzyme complex designated DICER COMPLEX, dices the VGAM3787 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3787 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3787 RNA is designated SEQ ID:85639, and is provided hereinbelow with reference to the sequence listing part.

[52982] VGAM3787 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3787 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3787 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52983] VGAM3787 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3787 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3787 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3787 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3787 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52984] The complementary binding of VGAM3787 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3787 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3787 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3787 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52985] It is appreciated that VGAM3787 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3787 host target genes. The mRNA of each one of this plurality of VGAM3787 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3787 RNA, herein designated VGAM RNA, and which when bound by VGAM3787 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3787 host target proteins.

[52986] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3787 gene, herein designated VGAM GENE, on one or more VGAM3787 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[52987] It is yet further appreciated that a function of VGAM3787 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3787 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3787

correlate with, and may be deduced from, the identity of the host target genes which VGAM3787 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[52988] Nucleotide sequences of the VGAM3787 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3787 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3787 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3787 are further described hereinbelow with reference to Table 1.

[52989] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3787 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[52990] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3788 (VGAM3788) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[52991] VGAM3788 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3788 was detected is described hereinabove with reference to Figs. 2–8.

[52992] VGAM3788 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3788 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[52993] VGAM3788 gene, herein designated VGAM GENE, encodes a VGAM3788 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3788 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3788 precursor RNA is designated SEQ ID:85689, and is provided hereinbelow with reference to the sequence listing part.

[52994] VGAM3788 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3788 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[52995] An enzyme complex designated DICER COMPLEX, dices the VGAM3788 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3788 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3788 RNA is designated SEQ ID:85690, and is provided hereinbelow with reference to the sequence listing part.

[52996] VGAM3788 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3788 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3788 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[52997] VGAM3788 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3788 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3788 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3788 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3788 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[52998] The complementary binding of VGAM3788 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3788 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3788 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3788 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[52999] It is appreciated that VGAM3788 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3788 host target genes. The mRNA of each one of this plurality of VGAM3788 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3788 RNA, herein designated VGAM RNA, and which when bound by VGAM3788 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3788 host target proteins.

[53000] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3788 gene, herein designated VGAM GENE, on one or more VGAM3788 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53001] It is yet further appreciated that a function of VGAM3788 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3788 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3788 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3788 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53002] Nucleotide sequences of the VGAM3788 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3788 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3788 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3788 are further described hereinbelow with reference to Table 1.

[53003] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3788 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53004] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3789 (VGAM3789) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53005] VGAM3789 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3789 was detected is described hereinabove with reference to Figs. 2–8.

[53006] VGAM3789 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Melanoplus sanguinipes entomopoxvirus. VGAM3789 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53007] VGAM3789 gene, herein designated VGAM GENE, encodes a VGAM3789 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3789 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3789 precursor RNA is designated SEQ ID:85700, and is provided hereinbelow with reference to the sequence listing part.

[53008] VGAM3789 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3789 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53009] An enzyme complex designated DICER COMPLEX, dices the VGAM3789 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3789 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3789 RNA is designated SEQ ID:85701, and is provided hereinbelow with reference to the sequence listing part.

[53010] VGAM3789 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3789 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3789 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53011] VGAM3789 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3789 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3789 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3789 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3789 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53012] The complementary binding of VGAM3789 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3789 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3789 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3789 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53013] It is appreciated that VGAM3789 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3789 host target genes. The mRNA of each one of this plurality of VGAM3789 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3789 RNA, herein designated VGAM RNA, and which when bound by VGAM3789 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3789 host target proteins.

[53014] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3789 gene, herein designated VGAM GENE, on one or more VGAM3789 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53015] It is yet further appreciated that a function of VGAM3789 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3789 include diagnosis, prevention and treatment of viral infection by Melanoplus sanguinipes entomopoxvirus. Specific functions, and accordingly utilities, of VGAM3789 correlate with, and may be deduced from, the identity of the host target genes which VGAM3789 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53016] Nucleotide sequences of the VGAM3789 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3789 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3789 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3789 are further described hereinbelow with reference to Table 1.

[53017] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3789 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53018] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3790 (VGAM3790) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53019] VGAM3790 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3790 was detected is described hereinabove with reference to Figs. 2-8.

[53020] VGAM3790 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3790 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53021] VGAM3790 gene, herein designated VGAM GENE, encodes

a VGAM3790 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3790 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3790 precursor RNA is designated SEQ ID:85706, and is provided hereinbelow with reference to the sequence listing part.

[53022] VGAM3790 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3790 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53023] An enzyme complex designated DICER COMPLEX, dices the VGAM3790 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3790 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3790 RNA is designated SEQ ID:85707, and is provided hereinbelow with reference to the sequence listing part.

[53024] VGAM3790 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3790 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3790 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53025] VGAM3790 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3790 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3790 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3790 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3790 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53026] The complementary binding of VGAM3790 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3790 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3790 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3790 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[53027] It is appreciated that VGAM3790 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3790 host target genes. The mRNA of each one of this plurality of VGAM3790 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3790 RNA, herein designated VGAM RNA, and which when bound by VGAM3790 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3790 host target proteins.

[53028] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3790 gene, herein designated VGAM GENE, on one or more VGAM3790 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53029] It is yet further appreciated that a function of VGAM3790 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3790 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3790 correlate with, and may be deduced from, the identity of the host target genes which VGAM3790 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53030] Nucleotide sequences of the VGAM3790 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3790 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3790 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3790 are further described hereinbelow with reference to Table 1.

[53031] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3790 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53032] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3791 (VGAM3791) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53033] VGAM3791 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3791 was detected is described hereinabove with reference to Figs. 2-8.

[53034] VGAM3791 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine rhinitis A virus. VGAM3791 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53035] VGAM3791 gene, herein designated VGAM GENE, encodes a VGAM3791 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3791 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3791 precursor RNA is designated SEQ ID:85716, and is provided hereinbelow with reference to the sequence listing part.

[53036] VGAM3791 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3791 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53037] An enzyme complex designated DICER COMPLEX, dices the VGAM3791 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3791 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3791 RNA is designated SEQ ID:85717, and is provided hereinbelow with reference to the sequence listing part.

[53038] VGAM3791 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3791 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3791 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53039] VGAM3791 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3791 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3791 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3791 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3791 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53040] The complementary binding of VGAM3791 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3791 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3791 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3791 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53041] It is appreciated that VGAM3791 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3791 host target genes. The mRNA of each one of this plurality of VGAM3791 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3791 RNA, herein designated VGAM RNA, and which when bound by VGAM3791 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3791 host target proteins.

[53042] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3791 gene, herein designated VGAM GENE, on one or more VGAM3791 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53043] It is yet further appreciated that a function of VGAM3791 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3791 include diagnosis, prevention and treatment of viral infection by Equine rhinitis A virus. Specific functions, and accordingly utilities, of VGAM3791 correlate with, and may be deduced from, the identity of the host target genes which VGAM3791 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53044] Nucleotide sequences of the VGAM3791 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3791 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3791 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3791 are further described hereinbelow with reference to Table 1.

[53045] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3791 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53046] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3792 (VGAM3792) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53047] VGAM3792 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3792 was detected is described hereinabove with reference to Figs. 2-8.

[53048] VGAM3792 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3792 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53049] VGAM3792 gene, herein designated VGAM GENE, encodes a VGAM3792 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3792 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3792 precursor RNA is designated SEQ ID:85740, and is provided hereinbelow with reference to the sequence listing part.

[53050] VGAM3792 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3792 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53051] An enzyme complex designated DICER COMPLEX, dices the VGAM3792 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3792 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3792 RNA is designated SEQ ID:85741, and is provided hereinbelow with reference to the sequence listing part.

[53052] VGAM3792 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3792 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3792 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53053] VGAM3792 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3792 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3792 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3792 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3792 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53054] The complementary binding of VGAM3792 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3792 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3792 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3792 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53055] It is appreciated that VGAM3792 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3792 host target genes. The mRNA of each one of this plurality of VGAM3792 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3792 RNA, herein designated VGAM RNA, and which when bound by VGAM3792 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3792 host target proteins.

[53056] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3792 gene, herein designated VGAM GENE, on one or more VGAM3792 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53057] It is yet further appreciated that a function of VGAM3792 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3792 include diagnosis, prevention and treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3792 correlate with, and may be deduced from, the identity of the host target genes which VGAM3792 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53058] Nucleotide sequences of the VGAM3792 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3792 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3792 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3792 are further described hereinbelow with reference to Table 1.

[53059] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3792 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53060] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3793 (VGAM3793) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53061] VGAM3793 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3793 was detected is described hereinabove with reference to Figs. 2–8.

[53062] VGAM3793 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Swinepox virus. VGAM3793 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53063] VGAM3793 gene, herein designated VGAM GENE, encodes a VGAM3793 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3793 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3793 precursor RNA is designated SEQ ID:85756, and is provided hereinbelow with reference to the sequence listing part.

[53064] VGAM3793 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3793 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53065] An enzyme complex designated DICER COMPLEX, dices the VGAM3793 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3793 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3793 RNA is designated SEQ ID:85757, and is provided hereinbelow with reference to the sequence listing part.

[53066] VGAM3793 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3793 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3793 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53067] VGAM3793 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3793 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3793 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3793 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3793 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53068] The complementary binding of VGAM3793 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3793 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3793 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3793 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53069] It is appreciated that VGAM3793 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3793 host target genes. The mRNA of each one of this plurality of VGAM3793 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3793 RNA, herein designated VGAM RNA, and which when bound by VGAM3793 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3793 host target proteins.

[53070] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3793 gene, herein designated VGAM GENE, on one or more VGAM3793 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

[53071] It is yet further appreciated that a function of VGAM3793 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3793 include diagnosis, prevention and treatment of viral infection by Swinepox virus. Specific functions, and accordingly utilities, of VGAM3793 correlate with, and may be deduced from, the identity of the host target genes which VGAM3793 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53072] Nucleotide sequences of the VGAM3793 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3793 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3793 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3793 are further described hereinbelow with reference to Table 1.

[53073] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3793 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53074] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3794 (VGAM3794) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53075] VGAM3794 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3794 was detected is described hereinabove with reference to Figs. 2-8.

[53076] VGAM3794 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rice ragged stunt virus. VGAM3794 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53077] VGAM3794 gene, herein designated VGAM GENE, encodes a VGAM3794 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3794 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3794 precursor RNA is designated SEQ ID:85761, and is provided hereinbelow with reference to the sequence listing part.

[53078] VGAM3794 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3794 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53079] An enzyme complex designated DICER COMPLEX, dices the VGAM3794 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3794 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3794 RNA is designated SEQ ID:85762, and is provided hereinbelow with reference to the sequence listing part.

[53080] VGAM3794 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3794 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3794 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53081] VGAM3794 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3794 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3794 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3794 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3794 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53082] The complementary binding of VGAM3794 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3794 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3794 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3794 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53083] It is appreciated that VGAM3794 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3794 host target genes. The mRNA of

each one of this plurality of VGAM3794 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3794 RNA, herein designated VGAM RNA, and which when bound by VGAM3794 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3794 host target proteins.

[53084] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3794 gene, herein designated VGAM GENE, on one or more VGAM3794 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[53085] It is yet further appreciated that a function of VGAM3794 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3794 include diagnosis, prevention and treatment of viral infection by Rice ragged stunt virus. Specific functions, and accordingly utilities, of VGAM3794 correlate with, and may be deduced from, the identity of the host target genes which VGAM3794 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53086] Nucleotide sequences of the VGAM3794 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3794 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3794 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3794 are further described hereinbelow with reference to Table 1.

[53087] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3794 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[53088] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3795 (VGAM3795) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53089] VGAM3795 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3795 was detected is described hereinabove with reference to Figs. 2–8.

[53090] VGAM3795 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 4. VGAM3795 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53091] VGAM3795 gene, herein designated VGAM GENE, encodes a VGAM3795 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3795 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3795 precursor RNA is designated SEQ ID:85839, and is provided hereinbelow with reference to the sequence listing part.

[53092] VGAM3795 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3795 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53093] An enzyme complex designated DICER COMPLEX, dices the VGAM3795 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3795 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3795 RNA is designated SEQ ID:85840,

and is provided hereinbelow with reference to the sequence listing part.

[53094] VGAM3795 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3795 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3795 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53095] VGAM3795 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3795 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3795 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3795 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3795 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53096] The complementary binding of VGAM3795 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3795 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3795 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3795 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53097] It is appreciated that VGAM3795 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3795 host target genes. The mRNA of each one of this plurality of VGAM3795 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3795 RNA, herein designated VGAM RNA, and which when bound by VGAM3795 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3795 host target proteins.

[53098] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3795 gene, herein designated VGAM GENE, on one or more VGAM3795 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53099] It is yet further appreciated that a function of VGAM3795 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3795 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3795 correlate with, and may be deduced from, the identity of the host target genes which VGAM3795 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53100] Nucleotide sequences of the VGAM3795 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3795 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3795 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3795 are further described hereinbelow with reference to Table 1.

[53101] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3795 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53102] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3796 (VGAM3796) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53103] VGAM3796 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3796 was detected is described hereinabove with reference to Figs. 2–8.

[53104] VGAM3796 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Bovine herpesvirus 1. VGAM3796 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53105] VGAM3796 gene, herein designated VGAM GENE, encodes a VGAM3796 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3796 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3796 precu-

sor RNA is designated SEQ ID:85842, and is provided hereinbelow with reference to the sequence listing part.

[53106] VGAM3796 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3796 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53107] An enzyme complex designated DICER COMPLEX, dices the VGAM3796 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3796 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3796 RNA is designated SEQ ID:85843, and is provided hereinbelow with reference to the se-

quence listing part.

[53108] VGAM3796 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3796 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3796 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53109] VGAM3796 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3796 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3796 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3796 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3796 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53110] The complementary binding of VGAM3796 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3796 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3796 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3796 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53111] It is appreciated that VGAM3796 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3796 host target genes. The mRNA of each one of this plurality of VGAM3796 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3796 RNA, herein designated VGAM RNA, and which when bound by VGAM3796 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3796 host target proteins.

[53112] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3796 gene, herein designated VGAM GENE, on one or more VGAM3796 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53113] It is yet further appreciated that a function of VGAM3796

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3796 include diagnosis, prevention and treatment of viral infection by Bovine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3796 correlate with, and may be deduced from, the identity of the host target genes which VGAM3796 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53114] Nucleotide sequences of the VGAM3796 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3796 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3796 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3796 are further described hereinbelow with reference to Table 1.

[53115] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3796 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53116] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3797 (VGAM3797) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53117] VGAM3797 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3797 was detected is described hereinabove with reference to Figs. 2–8.

[53118] VGAM3797 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3797 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53119] VGAM3797 gene, herein designated VGAM GENE, encodes a VGAM3797 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3797 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3797 precursor RNA is designated SEQ ID:85865, and is provided

hereinbelow with reference to the sequence listing part.

[53120] VGAM3797 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3797 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53121] An enzyme complex designated DICER COMPLEX, dices the VGAM3797 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3797 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3797 RNA is designated SEQ ID:85866, and is provided hereinbelow with reference to the sequence listing part.

[53122] VGAM3797 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3797 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3797 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53123] VGAM3797 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3797 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3797 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3797 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3797 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53124] The complementary binding of VGAM3797 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3797 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3797 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3797 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53125] It is appreciated that VGAM3797 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3797 host target genes. The mRNA of each one of this plurality of VGAM3797 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3797 RNA, herein designated VGAM RNA, and which when bound by VGAM3797 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3797 host target proteins.

[53126] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3797 gene, herein designated VGAM GENE, on one or more VGAM3797 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53127] It is yet further appreciated that a function of VGAM3797 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3797 include diagnosis, prevention and treatment of viral infection by *Paramecium bursaria* Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3797 correlate with, and may be deduced from, the identity of the host target genes which VGAM3797 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53128] Nucleotide sequences of the VGAM3797 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3797 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3797 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3797 are further described hereinbelow with reference to Table 1.

[53129] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3797 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53130] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3798 (VGAM3798) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53131] VGAM3798 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3798 was detected is described hereinabove with reference to Figs. 2–8.

[53132] VGAM3798 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6B. VGAM3798 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53133] VGAM3798 gene, herein designated VGAM GENE, encodes a VGAM3798 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3798 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3798 precursor RNA is designated SEQ ID:85869, and is provided hereinbelow with reference to the sequence listing part.

[53134] VGAM3798 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3798 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53135] An enzyme complex designated DICER COMPLEX, dices the VGAM3798 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3798 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3798 RNA is designated SEQ ID:85870, and is provided hereinbelow with reference to the sequence listing part.

[53136] VGAM3798 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3798 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3798 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53137] VGAM3798 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3798 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3798 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3798 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3798 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53138] The complementary binding of VGAM3798 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3798 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3798 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3798 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53139] It is appreciated that VGAM3798 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3798 host target genes. The mRNA of each one of this plurality of VGAM3798 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3798 RNA, herein designated VGAM

RNA, and which when bound by VGAM3798 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3798 host target proteins.

[53140] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3798 gene, herein designated VGAM GENE, on one or more VGAM3798 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53141] It is yet further appreciated that a function of VGAM3798 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3798 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6B. Specific functions, and accordingly utilities, of VGAM3798 correlate with, and may be deduced from, the identity of the host target genes which VGAM3798 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53142] Nucleotide sequences of the VGAM3798 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3798 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3798 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3798 are further described hereinbelow with reference to Table 1.

[53143] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3798 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53144] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3799 (VGAM3799) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53145] VGAM3799 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3799 was detected is described hereinabove with reference to Figs. 2-8.

[53146] VGAM3799 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Chimpanzee cytomegalovirus. VGAM3799 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53147] VGAM3799 gene, herein designated VGAM GENE, encodes a VGAM3799 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3799 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3799 precursor RNA is designated SEQ ID:85882, and is provided hereinbelow with reference to the sequence listing part.

[53148] VGAM3799 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3799 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53149] An enzyme complex designated DICER COMPLEX, dices the VGAM3799 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3799 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3799 RNA is designated SEQ ID:85883, and is provided hereinbelow with reference to the sequence listing part.

[53150] VGAM3799 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3799 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3799 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53151] VGAM3799 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3799 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3799 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3799 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3799 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53152] The complementary binding of VGAM3799 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3799 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3799 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3799 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53153] It is appreciated that VGAM3799 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3799 host target genes. The mRNA of each one of this plurality of VGAM3799 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3799 RNA, herein designated VGAM RNA, and which when bound by VGAM3799 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3799 host target proteins.

[53154] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3799 gene, herein designated VGAM GENE, on one or more VGAM3799 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53155] It is yet further appreciated that a function of VGAM3799 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3799 include diagnosis, prevention and

treatment of viral infection by Chimpanzee cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3799 correlate with, and may be deduced from, the identity of the host target genes which VGAM3799 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53156] Nucleotide sequences of the VGAM3799 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3799 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3799 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3799 are further described hereinbelow with reference to Table 1.

[53157] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3799 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53158] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3800 (VGAM3800) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53159] VGAM3800 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3800 was detected is described hereinabove with reference to Figs. 2–8.

[53160] VGAM3800 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Macaca mulatta rhadinovirus. VGAM3800 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53161] VGAM3800 gene, herein designated VGAM GENE, encodes a VGAM3800 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3800 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3800 precursor RNA is designated SEQ ID:86161, and is provided hereinbelow with reference to the sequence listing part.

[53162] VGAM3800 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3800 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53163] An enzyme complex designated DICER COMPLEX, dices the VGAM3800 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3800 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3800 RNA is designated SEQ ID:86162, and is provided hereinbelow with reference to the sequence listing part.

[53164] VGAM3800 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3800 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3800 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53165] VGAM3800 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3800 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3800 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3800 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3800 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53166] The complementary binding of VGAM3800 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3800 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3800 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3800 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53167] It is appreciated that VGAM3800 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3800 host target genes. The mRNA of each one of this plurality of VGAM3800 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3800 RNA, herein designated VGAM RNA, and which when bound by VGAM3800 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3800 host target proteins.

[53168] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3800 gene, herein designated VGAM GENE, on one or more VGAM3800 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53169] It is yet further appreciated that a function of VGAM3800 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3800 include diagnosis, prevention and treatment of viral infection by *Macaca mulatta* rhadi-

novirus. Specific functions, and accordingly utilities, of VGAM3800 correlate with, and may be deduced from, the identity of the host target genes which VGAM3800 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53170] Nucleotide sequences of the VGAM3800 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3800 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3800 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3800 are further described hereinbelow with reference to Table 1.

[53171] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3800 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53172] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3801 (VGAM3801) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[53173] VGAM3801 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3801 was detected is described hereinabove with reference to Figs. 2–8.

[53174] VGAM3801 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Meleagrid herpesvirus 1. VGAM3801 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53175] VGAM3801 gene, herein designated VGAM GENE, encodes a VGAM3801 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3801 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3801 precursor RNA is designated SEQ ID:86165, and is provided hereinbelow with reference to the sequence listing part.

[53176] VGAM3801 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3801 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53177] An enzyme complex designated DICER COMPLEX, dices the VGAM3801 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3801 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3801 RNA is designated SEQ ID:86166, and is provided hereinbelow with reference to the sequence listing part.

[53178] VGAM3801 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3801 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3801 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53179] VGAM3801 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3801 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3801 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3801 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3801 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53180] The complementary binding of VGAM3801 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3801 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3801 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3801 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53181] It is appreciated that VGAM3801 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3801 host target genes. The mRNA of each one of this plurality of VGAM3801 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3801 RNA, herein designated VGAM RNA, and which when bound by VGAM3801 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3801 host target proteins.

[53182] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3801 gene, herein designated VGAM GENE, on one or more VGAM3801 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53183] It is yet further appreciated that a function of VGAM3801 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3801 include diagnosis, prevention and treatment of viral infection by Meleagrid herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3801

correlate with, and may be deduced from, the identity of the host target genes which VGAM3801 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53184] Nucleotide sequences of the VGAM3801 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3801 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3801 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3801 are further described hereinbelow with reference to Table 1.

[53185] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3801 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53186] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3802 (VGAM3802) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[53187] VGAM3802 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3802 was detected is described hereinabove with reference to Figs. 2–8.

[53188] VGAM3802 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3802 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53189] VGAM3802 gene, herein designated VGAM GENE, encodes a VGAM3802 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3802 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3802 precursor RNA is designated SEQ ID:86184, and is provided hereinbelow with reference to the sequence listing part.

[53190] VGAM3802 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3802 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53191] An enzyme complex designated DICER COMPLEX, dices the VGAM3802 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3802 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3802 RNA is designated SEQ ID:86185, and is provided hereinbelow with reference to the sequence listing part.

[53192] VGAM3802 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3802 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3802 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53193] VGAM3802 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3802 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3802 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3802 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3802 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53194] The complementary binding of VGAM3802 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3802 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3802 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3802 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53195] It is appreciated that VGAM3802 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3802 host target genes. The mRNA of each one of this plurality of VGAM3802 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3802 RNA, herein designated VGAM RNA, and which when bound by VGAM3802 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3802 host target proteins.

[53196] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3802 gene, herein designated VGAM GENE, on one or more VGAM3802 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53197] It is yet further appreciated that a function of VGAM3802 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3802 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3802 correlate with, and may be deduced from, the

identity of the host target genes which VGAM3802 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53198] Nucleotide sequences of the VGAM3802 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3802 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3802 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3802 are further described hereinbelow with reference to Table 1.

[53199] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3802 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53200] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3803 (VGAM3803) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53201] VGAM3803 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3803 was detected is described hereinabove with reference to Figs. 2–8.

[53202] VGAM3803 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3803 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53203] VGAM3803 gene, herein designated VGAM GENE, encodes a VGAM3803 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3803 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3803 precursor RNA is designated SEQ ID:86195, and is provided hereinbelow with reference to the sequence listing part.

[53204] VGAM3803 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3803 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53205] An enzyme complex designated DICER COMPLEX, dices the VGAM3803 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3803 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3803 RNA is designated SEQ ID:86196, and is provided hereinbelow with reference to the sequence listing part.

[53206] VGAM3803 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3803 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3803 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53207] VGAM3803 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3803 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3803 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3803 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3803 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53208] The complementary binding of VGAM3803 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3803 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3803 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3803 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53209] It is appreciated that VGAM3803 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3803 host target genes. The mRNA of each one of this plurality of VGAM3803 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3803 RNA, herein designated VGAM RNA, and which when bound by VGAM3803 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3803 host target proteins.

[53210] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3803 gene, herein designated VGAM GENE, on one or more VGAM3803 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53211] It is yet further appreciated that a function of VGAM3803 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3803 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3803 correlate with, and may be deduced from, the identity of the host target genes which VGAM3803 binds

and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53212] Nucleotide sequences of the VGAM3803 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3803 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3803 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3803 are further described hereinbelow with reference to Table 1.

[53213] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3803 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53214] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3804 (VGAM3804) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53215] VGAM3804 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3804 was detected is described hereinabove with reference to Figs. 2–8.

[53216] VGAM3804 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human papillomavirus type 41. VGAM3804 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53217] VGAM3804 gene, herein designated VGAM GENE, encodes a VGAM3804 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3804 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3804 precursor RNA is designated SEQ ID:86259, and is provided hereinbelow with reference to the sequence listing part.

[53218] VGAM3804 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3804 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53219] An enzyme complex designated DICER COMPLEX, dices the VGAM3804 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3804 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3804 RNA is designated SEQ ID:86260, and is provided hereinbelow with reference to the sequence listing part.

[53220] VGAM3804 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3804 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3804 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53221] VGAM3804 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3804 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3804 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3804 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3804 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[53222] The complementary binding of VGAM3804 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3804 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3804 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3804 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53223] It is appreciated that VGAM3804 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3804 host target genes. The mRNA of each one of this plurality of VGAM3804 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3804 RNA, herein designated VGAM RNA, and which when bound by VGAM3804 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3804 host target proteins.

[53224] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3804 gene, herein designated VGAM GENE, on one or more VGAM3804 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53225] It is yet further appreciated that a function of VGAM3804 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3804 include diagnosis, prevention and treatment of viral infection by Human papillomavirus type 41. Specific functions, and accordingly utilities, of VGAM3804 correlate with, and may be deduced from, the identity of the host target genes which VGAM3804 binds and inhibits, and the function of these host target genes,

as elaborated hereinbelow.

[53226] Nucleotide sequences of the VGAM3804 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3804 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3804 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3804 are further described hereinbelow with reference to Table 1.

[53227] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3804 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53228] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3805 (VGAM3805) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53229] VGAM3805 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3805 was detected is described hereinabove with reference to Figs. 2–8.

[53230] VGAM3805 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Gallid herpesvirus 3. VGAM3805 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53231] VGAM3805 gene, herein designated VGAM GENE, encodes a VGAM3805 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3805 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3805 precursor RNA is designated SEQ ID:86370, and is provided hereinbelow with reference to the sequence listing part.

[53232] VGAM3805 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3805 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53233] An enzyme complex designated DICER COMPLEX, dices the VGAM3805 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3805 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3805 RNA is designated SEQ ID:86371, and is provided hereinbelow with reference to the sequence listing part.

[53234] VGAM3805 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3805 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3805 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[53235] VGAM3805 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3805 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3805 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3805 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3805 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53236] The complementary binding of VGAM3805 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3805 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3805 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3805 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53237] It is appreciated that VGAM3805 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3805 host target genes. The mRNA of each one of this plurality of VGAM3805 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3805 RNA, herein designated VGAM RNA, and which when bound by VGAM3805 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3805 host target proteins.

[53238] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3805 gene, herein designated VGAM GENE, on one

or more VGAM3805 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53239] It is yet further appreciated that a function of VGAM3805 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3805 include diagnosis, prevention and treatment of viral infection by Gallid herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3805 correlate with, and may be deduced from, the identity of the host target genes which VGAM3805 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53240] Nucleotide sequences of the VGAM3805 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3805 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3805 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3805 are further described hereinbelow with reference to Table 1.

[53241] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3805 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53242] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3806 (VGAM3806) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53243] VGAM3806 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3806 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[53244] VGAM3806 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3806 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53245] VGAM3806 gene, herein designated VGAM GENE, encodes a VGAM3806 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3806 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3806 precursor RNA is designated SEQ ID:86380, and is provided hereinbelow with reference to the sequence listing part.

[53246] VGAM3806 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3806 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53247] An enzyme complex designated DICER COMPLEX, dices the VGAM3806 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3806 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3806 RNA is designated SEQ ID:86381, and is provided hereinbelow with reference to the sequence listing part.

[53248] VGAM3806 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3806 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3806 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53249] VGAM3806 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3806 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3806 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3806 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3806 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53250] The complementary binding of VGAM3806 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3806 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3806 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3806 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53251] It is appreciated that VGAM3806 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3806 host target genes. The mRNA of each one of this plurality of VGAM3806 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3806 RNA, herein designated VGAM RNA, and which when bound by VGAM3806 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3806 host target proteins.

[53252] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3806 gene, herein designated VGAM GENE, on one or more VGAM3806 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53253] It is yet further appreciated that a function of VGAM3806 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3806 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3806 correlate with, and may be deduced from, the identity of the host target genes which VGAM3806 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53254] Nucleotide sequences of the VGAM3806 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3806 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3806 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3806 are further described hereinbelow with reference to Table 1.

[53255] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3806 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53256] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3807 (VGAM3807) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53257] VGAM3807 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3807 was detected is described hereinabove with reference to Figs. 2-8.

[53258] VGAM3807 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Hendra virus.

VGAM3807 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53259] VGAM3807 gene, herein designated VGAM GENE, encodes a VGAM3807 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3807 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3807 precursor RNA is designated SEQ ID:86386, and is provided hereinbelow with reference to the sequence listing part.

[53260] VGAM3807 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3807 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of

the second half thereof.

[53261] An enzyme complex designated DICER COMPLEX, dices the VGAM3807 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3807 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3807 RNA is designated SEQ ID:86387, and is provided hereinbelow with reference to the sequence listing part.

[53262] VGAM3807 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3807 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3807 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53263] VGAM3807 RNA, herein designated VGAM RNA, binds

complementarily to one or more host target binding sites located in untranslated regions of VGAM3807 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3807 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3807 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3807 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53264] The complementary binding of VGAM3807 RNA, herein designated VGAM RNA, to host target binding sites on

VGAM3807 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3807 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3807 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53265] It is appreciated that VGAM3807 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3807 host target genes. The mRNA of each one of this plurality of VGAM3807 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3807 RNA, herein designated VGAM RNA, and which when bound by VGAM3807 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3807 host target proteins.

[53266] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3807 gene, herein designated VGAM GENE, on one or more VGAM3807 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other

known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53267] It is yet further appreciated that a function of VGAM3807 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3807 include diagnosis, prevention and treatment of viral infection by Hendra virus. Specific functions, and accordingly utilities, of VGAM3807 correlate with, and may be deduced from, the identity of the host target genes which VGAM3807 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53268] Nucleotide sequences of the VGAM3807 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the

diced VGAM3807 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3807 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3807 are further described hereinbelow with reference to Table 1.

[53269] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3807 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53270] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3808 (VGAM3808) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53271] VGAM3808 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3808 was detected is described hereinabove with reference to Figs. 2-8.

[53272] VGAM3808 gene, herein designated VGAM GENE, is a viral

gene contained in the genome of Equine herpesvirus 1. VGAM3808 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53273] VGAM3808 gene, herein designated VGAM GENE, encodes a VGAM3808 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3808 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3808 precursor RNA is designated SEQ ID:86399, and is provided hereinbelow with reference to the sequence listing part.

[53274] VGAM3808 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3808 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53275] An enzyme complex designated DICER COMPLEX, dices the VGAM3808 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3808 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3808 RNA is designated SEQ ID:86400, and is provided hereinbelow with reference to the sequence listing part.

[53276] VGAM3808 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3808 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3808 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53277] VGAM3808 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites

located in untranslated regions of VGAM3808 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3808 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3808 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3808 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53278] The complementary binding of VGAM3808 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3808 host target RNA, herein designated VGAM

HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3808 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3808 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53279] It is appreciated that VGAM3808 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3808 host target genes. The mRNA of each one of this plurality of VGAM3808 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3808 RNA, herein designated VGAM RNA, and which when bound by VGAM3808 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3808 host target proteins.

[53280] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3808 gene, herein designated VGAM GENE, on one or more VGAM3808 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove

with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53281] It is yet further appreciated that a function of VGAM3808 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3808 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 1. Specific functions, and accordingly utilities, of VGAM3808 correlate with, and may be deduced from, the identity of the host target genes which VGAM3808 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53282] Nucleotide sequences of the VGAM3808 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3808 RNA, herein designated VGAM RNA, and

a schematic representation of the secondary folding of VGAM3808 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3808 are further described hereinbelow with reference to Table 1.

[53283] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3808 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53284] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3809 (VGAM3809) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53285] VGAM3809 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3809 was detected is described hereinabove with reference to Figs. 2-8.

[53286] VGAM3809 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Lettuce infectious yel-

lows virus. VGAM3809 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53287] VGAM3809 gene, herein designated VGAM GENE, encodes a VGAM3809 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3809 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3809 precursor RNA is designated SEQ ID:86480, and is provided hereinbelow with reference to the sequence listing part.

[53288] VGAM3809 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3809 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53289] An enzyme complex designated DICER COMPLEX, dices

the VGAM3809 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3809 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3809 RNA is designated SEQ ID:86481, and is provided hereinbelow with reference to the sequence listing part.

[53290] VGAM3809 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3809 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3809 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53291] VGAM3809 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3809 host target

RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3809 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3809 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3809 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53292] The complementary binding of VGAM3809 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3809 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE

II and BINDING SITE III, inhibits translation of VGAM3809 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3809 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53293] It is appreciated that VGAM3809 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3809 host target genes. The mRNA of each one of this plurality of VGAM3809 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3809 RNA, herein designated VGAM RNA, and which when bound by VGAM3809 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3809 host target proteins.

[53294] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3809 gene, herein designated VGAM GENE, on one or more VGAM3809 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a spe-

cific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53295] It is yet further appreciated that a function of VGAM3809 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3809 include diagnosis, prevention and treatment of viral infection by Lettuce infectious yellows virus. Specific functions, and accordingly utilities, of VGAM3809 correlate with, and may be deduced from, the identity of the host target genes which VGAM3809 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53296] Nucleotide sequences of the VGAM3809 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3809 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of

VGAM3809 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3809 are further described hereinbelow with reference to Table 1.

[53297] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3809 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53298] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3810 (VGAM3810) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53299] VGAM3810 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3810 was detected is described hereinabove with reference to Figs. 2-8.

[53300] VGAM3810 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Paramecium bursaria Chlorella virus 1. VGAM3810 host target gene, herein

designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53301] VGAM3810 gene, herein designated VGAM GENE, encodes a VGAM3810 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3810 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3810 precursor RNA is designated SEQ ID:86489, and is provided hereinbelow with reference to the sequence listing part.

[53302] VGAM3810 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3810 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53303] An enzyme complex designated DICER COMPLEX, dices the VGAM3810 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, into VGAM3810 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3810 RNA is designated SEQ ID:86490, and is provided hereinbelow with reference to the sequence listing part.

[53304] VGAM3810 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3810 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3810 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53305] VGAM3810 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3810 host target RNA, herein designated VGAM HOST TARGET RNA. This

complementary binding is due to the fact that the nucleotide sequence of VGAM3810 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3810 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3810 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53306] The complementary binding of VGAM3810 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3810 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3810

host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3810 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53307] It is appreciated that VGAM3810 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3810 host target genes. The mRNA of each one of this plurality of VGAM3810 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3810 RNA, herein designated VGAM RNA, and which when bound by VGAM3810 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3810 host target proteins.

[53308] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3810 gene, herein designated VGAM GENE, on one or more VGAM3810 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated

only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53309] It is yet further appreciated that a function of VGAM3810 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3810 include diagnosis, prevention and treatment of viral infection by Paramecium bursaria Chlorella virus 1. Specific functions, and accordingly utilities, of VGAM3810 correlate with, and may be deduced from, the identity of the host target genes which VGAM3810 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53310] Nucleotide sequences of the VGAM3810 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3810 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3810 folded precursor RNA, herein designated

VGAM FOLDED PRECURSOR RNA, of VGAM3810 are further described hereinbelow with reference to Table 1.

[53311] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3810 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53312] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3811 (VGAM3811) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53313] VGAM3811 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3811 was detected is described hereinabove with reference to Figs. 2-8.

[53314] VGAM3811 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6. VGAM3811 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the

human genome.

[53315] VGAM3811 gene, herein designated VGAM GENE, encodes a VGAM3811 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3811 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3811 precursor RNA is designated SEQ ID:86492, and is provided hereinbelow with reference to the sequence listing part.

[53316] VGAM3811 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3811 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53317] An enzyme complex designated DICER COMPLEX, dices the VGAM3811 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3811 RNA,

herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3811 RNA is designated SEQ ID:86493, and is provided hereinbelow with reference to the sequence listing part.

[53318] VGAM3811 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3811 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3811 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53319] VGAM3811 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3811 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nu-

cleotide sequence of VGAM3811 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3811 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3811 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53320] The complementary binding of VGAM3811 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3811 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3811 host target RNA, herein designated VGAM HOST TARGET

RNA, into VGAM3811 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53321] It is appreciated that VGAM3811 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3811 host target genes. The mRNA of each one of this plurality of VGAM3811 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3811 RNA, herein designated VGAM RNA, and which when bound by VGAM3811 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3811 host target proteins.

[53322] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3811 gene, herein designated VGAM GENE, on one or more VGAM3811 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4

and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53323] It is yet further appreciated that a function of VGAM3811 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3811 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6. Specific functions, and accordingly utilities, of VGAM3811 correlate with, and may be deduced from, the identity of the host target genes which VGAM3811 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53324] Nucleotide sequences of the VGAM3811 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3811 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3811 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3811 are further

described hereinbelow with reference to Table 1.

[53325] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3811 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53326] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3812 (VGAM3812) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53327] VGAM3812 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3812 was detected is described hereinabove with reference to Figs. 2-8.

[53328] VGAM3812 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 6B. VGAM3812 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53329] VGAM3812 gene, herein designated VGAM GENE, encodes a VGAM3812 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3812 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3812 precursor RNA is designated SEQ ID:86530, and is provided hereinbelow with reference to the sequence listing part.

[53330] VGAM3812 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3812 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53331] An enzyme complex designated DICER COMPLEX, dices the VGAM3812 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3812 RNA, herein designated VGAM RNA, a single stranded ~22 nt

long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3812 RNA is designated SEQ ID:86531, and is provided hereinbelow with reference to the sequence listing part.

[53332] VGAM3812 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3812 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3812 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53333] VGAM3812 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3812 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3812 RNA, herein designated

VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3812 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3812 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53334] The complementary binding of VGAM3812 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3812 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3812 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3812 host target protein, herein desig-

nated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53335] It is appreciated that VGAM3812 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3812 host target genes. The mRNA of each one of this plurality of VGAM3812 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3812 RNA, herein designated VGAM RNA, and which when bound by VGAM3812 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3812 host target proteins.

[53336] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3812 gene, herein designated VGAM GENE, on one or more VGAM3812 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are

also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53337] It is yet further appreciated that a function of VGAM3812 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3812 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 6B. Specific functions, and accordingly utilities, of VGAM3812 correlate with, and may be deduced from, the identity of the host target genes which VGAM3812 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53338] Nucleotide sequences of the VGAM3812 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3812 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3812 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3812 are further described hereinbelow with reference to Table 1.

[53339] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3812 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53340] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3813 (VGAM3813) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53341] VGAM3813 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3813 was detected is described hereinabove with reference to Figs. 2-8.

[53342] VGAM3813 gene, herein designated VGAM GENE, is a viral gene contained in the genome of West Nile virus. VGAM3813 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53343] VGAM3813 gene, herein designated VGAM GENE, encodes

a VGAM3813 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3813 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3813 precursor RNA is designated SEQ ID:86552, and is provided hereinbelow with reference to the sequence listing part.

[53344] VGAM3813 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3813 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53345] An enzyme complex designated DICER COMPLEX, dices the VGAM3813 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3813 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a

hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3813 RNA is designated SEQ ID:86553, and is provided hereinbelow with reference to the sequence listing part.

[53346] VGAM3813 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3813 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3813 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53347] VGAM3813 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3813 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3813 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed

sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3813 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3813 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53348] The complementary binding of VGAM3813 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3813 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3813 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3813 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target

protein is therefore outlined by a broken line.

[53349] It is appreciated that VGAM3813 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3813 host target genes. The mRNA of each one of this plurality of VGAM3813 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3813 RNA, herein designated VGAM RNA, and which when bound by VGAM3813 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3813 host target proteins.

[53350] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3813 gene, herein designated VGAM GENE, on one or more VGAM3813 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate ex-

pression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53351] It is yet further appreciated that a function of VGAM3813 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3813 include diagnosis, prevention and treatment of viral infection by West Nile virus. Specific functions, and accordingly utilities, of VGAM3813 correlate with, and may be deduced from, the identity of the host target genes which VGAM3813 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53352] Nucleotide sequences of the VGAM3813 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3813 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3813 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3813 are further described hereinbelow with reference to Table 1.

[53353] Nucleotide sequences of host target binding sites, such as

BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3813 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53354] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3814 (VGAM3814) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53355] VGAM3814 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3814 was detected is described hereinabove with reference to Figs. 2-8.

[53356] VGAM3814 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Molluscum contagiosum virus. VGAM3814 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53357] VGAM3814 gene, herein designated VGAM GENE, encodes a VGAM3814 precursor RNA, herein designated VGAM

PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3814 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3814 precursor RNA is designated SEQ ID:86567, and is provided hereinbelow with reference to the sequence listing part.

[53358] VGAM3814 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3814 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53359] An enzyme complex designated DICER COMPLEX, dices the VGAM3814 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3814 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short

~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3814 RNA is designated SEQ ID:86568, and is provided hereinbelow with reference to the sequence listing part.

[53360] VGAM3814 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3814 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3814 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53361] VGAM3814 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3814 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3814 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host

target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3814 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3814 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53362] The complementary binding of VGAM3814 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3814 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3814 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3814 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53363] It is appreciated that VGAM3814 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3814 host target genes. The mRNA of each one of this plurality of VGAM3814 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3814 RNA, herein designated VGAM RNA, and which when bound by VGAM3814 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3814 host target proteins.

[53364] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3814 gene, herein designated VGAM GENE, on one or more VGAM3814 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, al-

though specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53365] It is yet further appreciated that a function of VGAM3814 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3814 include diagnosis, prevention and treatment of viral infection by Molluscum contagiosum virus. Specific functions, and accordingly utilities, of VGAM3814 correlate with, and may be deduced from, the identity of the host target genes which VGAM3814 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53366] Nucleotide sequences of the VGAM3814 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3814 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3814 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3814 are further described hereinbelow with reference to Table 1.

[53367] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of

Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3814 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53368] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3815 (VGAM3815) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53369] VGAM3815 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3815 was detected is described hereinabove with reference to Figs. 2-8.

[53370] VGAM3815 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Ovine adenovirus 7. VGAM3815 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53371] VGAM3815 gene, herein designated VGAM GENE, encodes a VGAM3815 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and un-

like most ordinary genes, VGAM3815 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3815 precursor RNA is designated SEQ ID:86642, and is provided hereinbelow with reference to the sequence listing part.

[53372] VGAM3815 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3815 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53373] An enzyme complex designated DICER COMPLEX, dices the VGAM3815 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3815 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex

comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3815 RNA is designated SEQ ID:86643, and is provided hereinbelow with reference to the sequence listing part.

[53374] VGAM3815 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3815 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3815 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53375] VGAM3815 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3815 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3815 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3

such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3815 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3815 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53376] The complementary binding of VGAM3815 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3815 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3815 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3815 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53377] It is appreciated that VGAM3815 host target gene, herein

designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3815 host target genes. The mRNA of each one of this plurality of VGAM3815 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3815 RNA, herein designated VGAM RNA, and which when bound by VGAM3815 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3815 host target proteins.

[53378] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3815 gene, herein designated VGAM GENE, on one or more VGAM3815 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these

other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53379] It is yet further appreciated that a function of VGAM3815 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3815 include diagnosis, prevention and treatment of viral infection by Ovine adenovirus 7. Specific functions, and accordingly utilities, of VGAM3815 correlate with, and may be deduced from, the identity of the host target genes which VGAM3815 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53380] Nucleotide sequences of the VGAM3815 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3815 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3815 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3815 are further described hereinbelow with reference to Table 1.

[53381] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the

complementarity of each of these host target binding sites to VGAM3815 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53382] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3816 (VGAM3816) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53383] VGAM3816 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3816 was detected is described hereinabove with reference to Figs. 2–8.

[53384] VGAM3816 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Murray Valley encephalitis virus. VGAM3816 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53385] VGAM3816 gene, herein designated VGAM GENE, encodes a VGAM3816 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3816 precursor RNA,

herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3816 precursor RNA is designated SEQ ID:86661, and is provided hereinbelow with reference to the sequence listing part.

[53386] VGAM3816 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3816 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53387] An enzyme complex designated DICER COMPLEX, dices the VGAM3816 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3816 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other

necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3816 RNA is designated SEQ ID:86662, and is provided hereinbelow with reference to the sequence listing part.

[53388] VGAM3816 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3816 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3816 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53389] VGAM3816 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3816 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3816 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I,

BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3816 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3816 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53390] The complementary binding of VGAM3816 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3816 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3816 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3816 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53391] It is appreciated that VGAM3816 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents

a plurality of VGAM3816 host target genes. The mRNA of each one of this plurality of VGAM3816 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3816 RNA, herein designated VGAM RNA, and which when bound by VGAM3816 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3816 host target proteins.

[53392] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3816 gene, herein designated VGAM GENE, on one or more VGAM3816 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G.,

Perspective: Glimpses of a tiny RNA world, Science
294,779 (2001)).

- [53393] It is yet further appreciated that a function of VGAM3816 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3816 include diagnosis, prevention and treatment of viral infection by Murray Valley encephalitis virus. Specific functions, and accordingly utilities, of VGAM3816 correlate with, and may be deduced from, the identity of the host target genes which VGAM3816 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.
- [53394] Nucleotide sequences of the VGAM3816 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3816 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3816 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3816 are further described hereinbelow with reference to Table 1.
- [53395] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites

to VGAM3816 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53396] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3817 (VGAM3817) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53397] VGAM3817 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3817 was detected is described hereinabove with reference to Figs. 2-8.

[53398] VGAM3817 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Sonchus yellow net virus. VGAM3817 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53399] VGAM3817 gene, herein designated VGAM GENE, encodes a VGAM3817 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3817 precursor RNA, herein designated VGAM PRECURSOR RNA, does not en-

code a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3817 precursor RNA is designated SEQ ID:86667, and is provided hereinbelow with reference to the sequence listing part.

[53400] VGAM3817 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3817 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53401] An enzyme complex designated DICER COMPLEX, dices the VGAM3817 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3817 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide se-

quence of VGAM3817 RNA is designated SEQ ID:86668, and is provided hereinbelow with reference to the sequence listing part.

[53402] VGAM3817 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3817 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3817 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53403] VGAM3817 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3817 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3817 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is ap-

preciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3817 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3817 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53404] The complementary binding of VGAM3817 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3817 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3817 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3817 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53405] It is appreciated that VGAM3817 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3817 host target genes. The mRNA of

each one of this plurality of VGAM3817 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3817 RNA, herein designated VGAM RNA, and which when bound by VGAM3817 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3817 host target proteins.

[53406] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3817 gene, herein designated VGAM GENE, on one or more VGAM3817 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science

294,779 (2001)).

[53407] It is yet further appreciated that a function of VGAM3817 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3817 include diagnosis, prevention and treatment of viral infection by Sonchus yellow net virus. Specific functions, and accordingly utilities, of VGAM3817 correlate with, and may be deduced from, the identity of the host target genes which VGAM3817 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53408] Nucleotide sequences of the VGAM3817 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3817 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3817 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3817 are further described hereinbelow with reference to Table 1.

[53409] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3817 RNA, herein designated VGAM RNA, are de-

scribed hereinbelow with reference to Table 2.

[53410] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3818 (VGAM3818) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53411] VGAM3818 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3818 was detected is described hereinabove with reference to Figs. 2–8.

[53412] VGAM3818 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3818 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53413] VGAM3818 gene, herein designated VGAM GENE, encodes a VGAM3818 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3818 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly

similar to the nucleotide sequence of VGAM3818 precursor RNA is designated SEQ ID:86674, and is provided hereinbelow with reference to the sequence listing part.

[53414] VGAM3818 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3818 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53415] An enzyme complex designated DICER COMPLEX, dices the VGAM3818 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3818 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3818 RNA is designated SEQ ID:86675,

and is provided hereinbelow with reference to the sequence listing part.

[53416] VGAM3818 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3818 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3818 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53417] VGAM3818 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3818 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3818 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites

shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3818 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3818 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53418] The complementary binding of VGAM3818 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3818 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3818 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3818 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53419] It is appreciated that VGAM3818 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3818 host target genes. The mRNA of each one of this plurality of VGAM3818 host target genes

comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3818 RNA, herein designated VGAM RNA, and which when bound by VGAM3818 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3818 host target proteins.

[53420] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3818 gene, herein designated VGAM GENE, on one or more VGAM3818 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53421] It is yet further appreciated that a function of VGAM3818 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3818 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3818 correlate with, and may be deduced from, the identity of the host target genes which VGAM3818 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53422] Nucleotide sequences of the VGAM3818 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the duced VGAM3818 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3818 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3818 are further described hereinbelow with reference to Table 1.

[53423] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3818 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53424] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3819 (VGAM3819) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53425] VGAM3819 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3819 was detected is described hereinabove with reference to Figs. 2–8.

[53426] VGAM3819 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Cowpox virus. VGAM3819 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53427] VGAM3819 gene, herein designated VGAM GENE, encodes a VGAM3819 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3819 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3819 precursor

sor RNA is designated SEQ ID:86681, and is provided hereinbelow with reference to the sequence listing part.

[53428] VGAM3819 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3819 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53429] An enzyme complex designated DICER COMPLEX, dices the VGAM3819 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3819 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3819 RNA is designated SEQ ID:86682, and is provided hereinbelow with reference to the se-

quence listing part.

[53430] VGAM3819 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3819 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3819 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53431] VGAM3819 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3819 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3819 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not

meant to be limiting VGAM3819 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3819 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53432] The complementary binding of VGAM3819 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3819 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3819 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3819 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53433] It is appreciated that VGAM3819 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3819 host target genes. The mRNA of each one of this plurality of VGAM3819 host target genes comprises one or more host target binding sites, each

having a nucleotide sequence which is at least partly complementary to VGAM3819 RNA, herein designated VGAM RNA, and which when bound by VGAM3819 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3819 host target proteins.

[53434] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3819 gene, herein designated VGAM GENE, on one or more VGAM3819 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53435] It is yet further appreciated that a function of VGAM3819

is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3819 include diagnosis, prevention and treatment of viral infection by Cowpox virus. Specific functions, and accordingly utilities, of VGAM3819 correlate with, and may be deduced from, the identity of the host target genes which VGAM3819 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53436] Nucleotide sequences of the VGAM3819 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3819 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3819 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3819 are further described hereinbelow with reference to Table 1.

[53437] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3819 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53438] Fig. 1 further provides a conceptual description of another

novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3820 (VGAM3820) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53439] VGAM3820 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3820 was detected is described hereinabove with reference to Figs. 2–8.

[53440] VGAM3820 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3820 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53441] VGAM3820 gene, herein designated VGAM GENE, encodes a VGAM3820 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3820 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3820 precursor RNA is designated SEQ ID:86690, and is provided

hereinbelow with reference to the sequence listing part.

[53442] VGAM3820 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3820 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53443] An enzyme complex designated DICER COMPLEX, dices the VGAM3820 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3820 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3820 RNA is designated SEQ ID:86691, and is provided hereinbelow with reference to the sequence listing part.

[53444] VGAM3820 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3820 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3820 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53445] VGAM3820 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3820 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3820 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3820 RNA, herein designated

VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3820 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53446] The complementary binding of VGAM3820 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3820 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3820 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3820 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53447] It is appreciated that VGAM3820 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3820 host target genes. The mRNA of each one of this plurality of VGAM3820 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly com-

plementary to VGAM3820 RNA, herein designated VGAM RNA, and which when bound by VGAM3820 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3820 host target proteins.

[53448] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3820 gene, herein designated VGAM GENE, on one or more VGAM3820 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53449] It is yet further appreciated that a function of VGAM3820 is inhibition of expression of host target genes, as part of

a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3820 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3820 correlate with, and may be deduced from, the identity of the host target genes which VGAM3820 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53450] Nucleotide sequences of the VGAM3820 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3820 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3820 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3820 are further described hereinbelow with reference to Table 1.

[53451] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3820 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53452] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present

invention, referred to here as Viral Genomic Address Messenger 3821 (VGAM3821) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53453] VGAM3821 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3821 was detected is described hereinabove with reference to Figs. 2–8.

[53454] VGAM3821 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 3. VGAM3821 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53455] VGAM3821 gene, herein designated VGAM GENE, encodes a VGAM3821 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3821 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3821 precursor RNA is designated SEQ ID:86717, and is provided hereinbelow with reference to the sequence listing part.

[53456] VGAM3821 precursor RNA, herein designated VGAM PRE-CURSOR RNA, folds onto itself, forming VGAM3821 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53457] An enzyme complex designated DICER COMPLEX, dices the VGAM3821 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3821 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3821 RNA is designated SEQ ID:86718, and is provided hereinbelow with reference to the sequence listing part.

[53458] VGAM3821 host target gene, herein designated VGAM

HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3821 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3821 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53459] VGAM3821 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3821 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3821 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3821 RNA, herein designated VGAM RNA, may have a different number of host target

binding sites in untranslated regions of a VGAM3821 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53460] The complementary binding of VGAM3821 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3821 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3821 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3821 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53461] It is appreciated that VGAM3821 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3821 host target genes. The mRNA of each one of this plurality of VGAM3821 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3821 RNA, herein designated VGAM

RNA, and which when bound by VGAM3821 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3821 host target proteins.

[53462] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3821 gene, herein designated VGAM GENE, on one or more VGAM3821 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53463] It is yet further appreciated that a function of VGAM3821 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly,

utilities of VGAM3821 include diagnosis, prevention and treatment of viral infection by Human herpesvirus 3. Specific functions, and accordingly utilities, of VGAM3821 correlate with, and may be deduced from, the identity of the host target genes which VGAM3821 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53464] Nucleotide sequences of the VGAM3821 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the dived VGAM3821 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3821 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3821 are further described hereinbelow with reference to Table 1.

[53465] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3821 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53466] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Mes-

senger 3822 (VGAM3822) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53467] VGAM3822 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3822 was detected is described hereinabove with reference to Figs. 2-8.

[53468] VGAM3822 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Human herpesvirus 5. VGAM3822 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53469] VGAM3822 gene, herein designated VGAM GENE, encodes a VGAM3822 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3822 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3822 precursor RNA is designated SEQ ID:86721, and is provided hereinbelow with reference to the sequence listing part.

[53470] VGAM3822 precursor RNA, herein designated VGAM PRE-

CURSOR RNA, folds onto itself, forming VGAM3822 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53471] An enzyme complex designated DICER COMPLEX, dices the VGAM3822 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3822 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3822 RNA is designated SEQ ID:86722, and is provided hereinbelow with reference to the sequence listing part.

[53472] VGAM3822 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger

RNA, VGAM3822 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3822 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53473] VGAM3822 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3822 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3822 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3822 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3822 host

target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53474] The complementary binding of VGAM3822 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3822 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3822 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3822 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53475] It is appreciated that VGAM3822 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3822 host target genes. The mRNA of each one of this plurality of VGAM3822 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3822 RNA, herein designated VGAM RNA, and which when bound by VGAM3822 RNA, herein

designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3822 host target proteins.

[53476] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3822 gene, herein designated VGAM GENE, on one or more VGAM3822 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53477] It is yet further appreciated that a function of VGAM3822 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3822 include diagnosis, prevention and

treatment of viral infection by Human herpesvirus 5. Specific functions, and accordingly utilities, of VGAM3822 correlate with, and may be deduced from, the identity of the host target genes which VGAM3822 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53478] Nucleotide sequences of the VGAM3822 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3822 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3822 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3822 are further described hereinbelow with reference to Table 1.

[53479] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3822 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53480] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3823 (VGAM3823) viral gene, which modulates ex-

pression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53481] VGAM3823 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3823 was detected is described hereinabove with reference to Figs. 2–8.

[53482] VGAM3823 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Influenza B virus. VGAM3823 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53483] VGAM3823 gene, herein designated VGAM GENE, encodes a VGAM3823 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3823 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3823 precursor RNA is designated SEQ ID:86726, and is provided hereinbelow with reference to the sequence listing part.

[53484] VGAM3823 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3823 folded

precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53485] An enzyme complex designated DICER COMPLEX, dices the VGAM3823 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3823 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3823 RNA is designated SEQ ID:86727, and is provided hereinbelow with reference to the sequence listing part.

[53486] VGAM3823 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3823 host target RNA, herein designated

VGAM HOST TARGET RNA. VGAM3823 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53487] VGAM3823 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3823 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3823 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3823 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3823 host target RNA, herein designated VGAM HOST TARGET RNA.

It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53488] The complementary binding of VGAM3823 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3823 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3823 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3823 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53489] It is appreciated that VGAM3823 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3823 host target genes. The mRNA of each one of this plurality of VGAM3823 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3823 RNA, herein designated VGAM RNA, and which when bound by VGAM3823 RNA, herein designated VGAM RNA, causes inhibition of translation of

respective one or more VGAM3823 host target proteins.

[53490] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3823 gene, herein designated VGAM GENE, on one or more VGAM3823 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53491] It is yet further appreciated that a function of VGAM3823 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3823 include diagnosis, prevention and treatment of viral infection by Influenza B virus. Specific

functions, and accordingly utilities, of VGAM3823 correlate with, and may be deduced from, the identity of the host target genes which VGAM3823 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53492] Nucleotide sequences of the VGAM3823 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3823 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3823 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3823 are further described hereinbelow with reference to Table 1.

[53493] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3823 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53494] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3824 (VGAM3824) viral gene, which modulates expression of respective host target genes thereof, the func-

tion and utility of which host target genes is known in the art.

[53495] VGAM3824 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3824 was detected is described hereinabove with reference to Figs. 2–8.

[53496] VGAM3824 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Vaccinia virus. VGAM3824 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53497] VGAM3824 gene, herein designated VGAM GENE, encodes a VGAM3824 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3824 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3824 precursor RNA is designated SEQ ID:86754, and is provided hereinbelow with reference to the sequence listing part.

[53498] VGAM3824 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3824 folded precursor RNA, herein designated VGAM FOLDED PRECUR-

SOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53499] An enzyme complex designated DICER COMPLEX, dices the VGAM3824 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3824 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3824 RNA is designated SEQ ID:86755, and is provided hereinbelow with reference to the sequence listing part.

[53500] VGAM3824 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3824 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3824 host target RNA,

herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53501] VGAM3824 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3824 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3824 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3824 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3824 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host tar-

get binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53502] The complementary binding of VGAM3824 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3824 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3824 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3824 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53503] It is appreciated that VGAM3824 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3824 host target genes. The mRNA of each one of this plurality of VGAM3824 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3824 RNA, herein designated VGAM RNA, and which when bound by VGAM3824 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3824 host target proteins.

[53504] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3824 gene, herein designated VGAM GENE, on one or more VGAM3824 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53505] It is yet further appreciated that a function of VGAM3824 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3824 include diagnosis, prevention and treatment of viral infection by Vaccinia virus. Specific functions, and accordingly utilities, of VGAM3824 corre-

late with, and may be deduced from, the identity of the host target genes which VGAM3824 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53506] Nucleotide sequences of the VGAM3824 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3824 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3824 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3824 are further described hereinbelow with reference to Table 1.

[53507] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3824 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53508] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3825 (VGAM3825) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the

art.

[53509] VGAM3825 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3825 was detected is described hereinabove with reference to Figs. 2–8.

[53510] VGAM3825 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Equine herpesvirus 4. VGAM3825 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53511] VGAM3825 gene, herein designated VGAM GENE, encodes a VGAM3825 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3825 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3825 precursor RNA is designated SEQ ID:86762, and is provided hereinbelow with reference to the sequence listing part.

[53512] VGAM3825 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3825 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure.

As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53513] An enzyme complex designated DICER COMPLEX, dices the VGAM3825 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3825 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 55%) nucleotide sequence of VGAM3825 RNA is designated SEQ ID:86763, and is provided hereinbelow with reference to the sequence listing part.

[53514] VGAM3825 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3825 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3825 host target RNA, herein designated VGAM HOST TARGET RNA, comprises

three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53515] VGAM3825 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3825 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3825 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3825 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3825 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an

example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53516] The complementary binding of VGAM3825 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3825 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3825 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3825 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53517] It is appreciated that VGAM3825 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3825 host target genes. The mRNA of each one of this plurality of VGAM3825 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3825 RNA, herein designated VGAM RNA, and which when bound by VGAM3825 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3825 host target proteins.

[53518] It is further appreciated by one skilled in the art that the

mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3825 gene, herein designated VGAM GENE, on one or more VGAM3825 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53519] It is yet further appreciated that a function of VGAM3825 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3825 include diagnosis, prevention and treatment of viral infection by Equine herpesvirus 4. Specific functions, and accordingly utilities, of VGAM3825 correlate with, and may be deduced from, the identity of

the host target genes which VGAM3825 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53520] Nucleotide sequences of the VGAM3825 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3825 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3825 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3825 are further described hereinbelow with reference to Table 1.

[53521] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3825 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53522] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3826 (VGAM3826) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53523] VGAM3826 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3826 was detected is described hereinabove with reference to Figs. 2–8.

[53524] VGAM3826 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3826 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53525] VGAM3826 gene, herein designated VGAM GENE, encodes a VGAM3826 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3826 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3826 precursor RNA is designated SEQ ID:86778, and is provided hereinbelow with reference to the sequence listing part.

[53526] VGAM3826 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3826 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typi-

cal of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53527] An enzyme complex designated DICER COMPLEX, dices the VGAM3826 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3826 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3826 RNA is designated SEQ ID:86779, and is provided hereinbelow with reference to the sequence listing part.

[53528] VGAM3826 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3826 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3826 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding

gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53529] VGAM3826 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3826 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3826 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3826 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3826 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be lo-

cated in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53530] The complementary binding of VGAM3826 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3826 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3826 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3826 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53531] It is appreciated that VGAM3826 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3826 host target genes. The mRNA of each one of this plurality of VGAM3826 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3826 RNA, herein designated VGAM RNA, and which when bound by VGAM3826 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3826 host target proteins.

[53532] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with

specific reference to translational inhibition exerted by VGAM3826 gene, herein designated VGAM GENE, on one or more VGAM3826 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53533] It is yet further appreciated that a function of VGAM3826 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3826 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3826 correlate with, and may be deduced from, the identity of the host target genes which VGAM3826 binds and in-

hibits, and the function of these host target genes, as elaborated hereinbelow.

[53534] Nucleotide sequences of the VGAM3826 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3826 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3826 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3826 are further described hereinbelow with reference to Table 1.

[53535] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3826 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53536] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3827 (VGAM3827) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53537] VGAM3827 is a novel bioinformatically detected regula-

tory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3827 was detected is described hereinabove with reference to Figs. 2–8.

[53538] VGAM3827 gene, herein designated VGAM GENE, is a viral gene contained in the genome of African swine fever virus. VGAM3827 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53539] VGAM3827 gene, herein designated VGAM GENE, encodes a VGAM3827 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3827 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3827 precursor RNA is designated SEQ ID:86819, and is provided hereinbelow with reference to the sequence listing part.

[53540] VGAM3827 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3827 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the

fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53541] An enzyme complex designated DICER COMPLEX, dices the VGAM3827 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3827 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3827 RNA is designated SEQ ID:86820, and is provided hereinbelow with reference to the sequence listing part.

[53542] VGAM3827 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3827 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3827 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and

a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53543] VGAM3827 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3827 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3827 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3827 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3827 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both

3UTR and 5UTR regions.

[53544] The complementary binding of VGAM3827 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3827 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3827 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3827 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53545] It is appreciated that VGAM3827 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3827 host target genes. The mRNA of each one of this plurality of VGAM3827 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3827 RNA, herein designated VGAM RNA, and which when bound by VGAM3827 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3827 host target proteins.

[53546] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by

VGAM3827 gene, herein designated VGAM GENE, on one or more VGAM3827 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53547] It is yet further appreciated that a function of VGAM3827 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3827 include diagnosis, prevention and treatment of viral infection by African swine fever virus. Specific functions, and accordingly utilities, of VGAM3827 correlate with, and may be deduced from, the identity of the host target genes which VGAM3827 binds and inhibits, and the function of these host target genes, as

elaborated hereinbelow.

[53548] Nucleotide sequences of the VGAM3827 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3827 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3827 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3827 are further described hereinbelow with reference to Table 1.

[53549] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3827 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53550] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3828 (VGAM3828) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53551] VGAM3828 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene.

The method by which VGAM3828 was detected is described hereinabove with reference to Figs. 2–8.

[53552] VGAM3828 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Fowlpox virus.

VGAM3828 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53553] VGAM3828 gene, herein designated VGAM GENE, encodes a VGAM3828 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3828 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3828 precursor RNA is designated SEQ ID:86838, and is provided hereinbelow with reference to the sequence listing part.

[53554] VGAM3828 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3828 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the

RNA encoded by a miRNA gene is an accurate or partial inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53555] An enzyme complex designated DICER COMPLEX, dices the VGAM3828 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3828 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 28%) nucleotide sequence of VGAM3828 RNA is designated SEQ ID:86839, and is provided hereinbelow with reference to the sequence listing part.

[53556] VGAM3828 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3828 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3828 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN COD-

ING and 3UTR respectively.

[53557] VGAM3828 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3828 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3828 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3828 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3828 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53558] The complementary binding of VGAM3828 RNA, herein designated VGAM RNA, to host target binding sites on VGAM3828 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3828 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3828 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53559] It is appreciated that VGAM3828 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3828 host target genes. The mRNA of each one of this plurality of VGAM3828 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3828 RNA, herein designated VGAM RNA, and which when bound by VGAM3828 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3828 host target proteins.

[53560] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3828 gene, herein designated VGAM GENE, on one

or more VGAM3828 host target gene, herein designated VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53561] It is yet further appreciated that a function of VGAM3828 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3828 include diagnosis, prevention and treatment of viral infection by Fowlpox virus. Specific functions, and accordingly utilities, of VGAM3828 correlate with, and may be deduced from, the identity of the host target genes which VGAM3828 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53562] Nucleotide sequences of the VGAM3828 precursor RNA, herein designated VGAM PRECURSOR RNA, and of the diced VGAM3828 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3828 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3828 are further described hereinbelow with reference to Table 1.

[53563] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3828 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53564] Fig. 1 further provides a conceptual description of another novel bioinformatically detected viral gene of the present invention, referred to here as Viral Genomic Address Messenger 3829 (VGAM3829) viral gene, which modulates expression of respective host target genes thereof, the function and utility of which host target genes is known in the art.

[53565] VGAM3829 is a novel bioinformatically detected regulatory, non protein coding, viral micro RNA (miRNA) gene. The method by which VGAM3829 was detected is de-

scribed hereinabove with reference to Figs. 2–8.

[53566] VGAM3829 gene, herein designated VGAM GENE, is a viral gene contained in the genome of Rat cytomegalovirus. VGAM3829 host target gene, herein designated VGAM HOST TARGET GENE, is a human gene contained in the human genome.

[53567] VGAM3829 gene, herein designated VGAM GENE, encodes a VGAM3829 precursor RNA, herein designated VGAM PRECURSOR RNA. Similar to other miRNA genes, and unlike most ordinary genes, VGAM3829 precursor RNA, herein designated VGAM PRECURSOR RNA, does not encode a protein. A nucleotide sequence identical or highly similar to the nucleotide sequence of VGAM3829 precursor RNA is designated SEQ ID:86847, and is provided hereinbelow with reference to the sequence listing part.

[53568] VGAM3829 precursor RNA, herein designated VGAM PRECURSOR RNA, folds onto itself, forming VGAM3829 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, which has a two-dimensional hairpin structure. As is well known in the art, this hairpin structure, is typical of RNA encoded by miRNA genes, and is due to the fact that the nucleotide sequence of the first half of the RNA encoded by a miRNA gene is an accurate or partial

inversed-reversed sequence of the nucleotide sequence of the second half thereof.

[53569] An enzyme complex designated DICER COMPLEX, dices the VGAM3829 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, into VGAM3829 RNA, herein designated VGAM RNA, a single stranded ~22 nt long RNA segment. As is known in the art, dicing of a hairpin structured RNA precursor product into a short ~22nt RNA segment is catalyzed by an enzyme complex comprising an enzyme called Dicer together with other necessary proteins. A probable (over 35%) nucleotide sequence of VGAM3829 RNA is designated SEQ ID:86848, and is provided hereinbelow with reference to the sequence listing part.

[53570] VGAM3829 host target gene, herein designated VGAM HOST TARGET GENE, encodes a corresponding messenger RNA, VGAM3829 host target RNA, herein designated VGAM HOST TARGET RNA. VGAM3829 host target RNA, herein designated VGAM HOST TARGET RNA, comprises three regions, as is typical of mRNA of a protein coding gene: a 5 untranslated region, a protein coding region and a 3 untranslated region, designated 5UTR, PROTEIN CODING and 3UTR respectively.

[53571] VGAM3829 RNA, herein designated VGAM RNA, binds complementarily to one or more host target binding sites located in untranslated regions of VGAM3829 host target RNA, herein designated VGAM HOST TARGET RNA. This complementary binding is due to the fact that the nucleotide sequence of VGAM3829 RNA, herein designated VGAM RNA, is an accurate or a partial inversed-reversed sequence of the nucleotide sequence of each of the host target binding sites. As an illustration, Fig. 1 shows 3 such host target binding sites, designated BINDING SITE I, BINDING SITE II and BINDING SITE III respectively. It is appreciated that the number of host target binding sites shown in Fig. 1 is meant as an illustration only, and is not meant to be limiting VGAM3829 RNA, herein designated VGAM RNA, may have a different number of host target binding sites in untranslated regions of a VGAM3829 host target RNA, herein designated VGAM HOST TARGET RNA. It is further appreciated that while Fig. 1 depicts host target binding sites in the 3UTR region, this is meant as an example only these host target binding sites may be located in the 3UTR region, the 5UTR region, or in both 3UTR and 5UTR regions.

[53572] The complementary binding of VGAM3829 RNA, herein

designated VGAM RNA, to host target binding sites on VGAM3829 host target RNA, herein designated VGAM HOST TARGET RNA, such as BINDING SITE I, BINDING SITE II and BINDING SITE III, inhibits translation of VGAM3829 host target RNA, herein designated VGAM HOST TARGET RNA, into VGAM3829 host target protein, herein designated VGAM HOST TARGET PROTEIN. VGAM host target protein is therefore outlined by a broken line.

[53573] It is appreciated that VGAM3829 host target gene, herein designated VGAM HOST TARGET GENE, in fact represents a plurality of VGAM3829 host target genes. The mRNA of each one of this plurality of VGAM3829 host target genes comprises one or more host target binding sites, each having a nucleotide sequence which is at least partly complementary to VGAM3829 RNA, herein designated VGAM RNA, and which when bound by VGAM3829 RNA, herein designated VGAM RNA, causes inhibition of translation of respective one or more VGAM3829 host target proteins.

[53574] It is further appreciated by one skilled in the art that the mode of translational inhibition illustrated by Fig. 1 with specific reference to translational inhibition exerted by VGAM3829 gene, herein designated VGAM GENE, on one or more VGAM3829 host target gene, herein designated

VGAM HOST TARGET GENE, is in fact common to other known non-viral miRNA genes. As mentioned hereinabove with reference to the background section, although a specific complementary binding site has been demonstrated only for some of the known miRNA genes (primarily Lin-4 and Let-7), all other recently discovered miRNA genes are also believed by those skilled in the art to modulate expression of other genes by complementary binding, although specific complementary binding sites of these other miRNA genes have not yet been found (Ruvkun G., Perspective: Glimpses of a tiny RNA world, Science 294,779 (2001)).

[53575] It is yet further appreciated that a function of VGAM3829 is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGAM3829 include diagnosis, prevention and treatment of viral infection by Rat cytomegalovirus. Specific functions, and accordingly utilities, of VGAM3829 correlate with, and may be deduced from, the identity of the host target genes which VGAM3829 binds and inhibits, and the function of these host target genes, as elaborated hereinbelow.

[53576] Nucleotide sequences of the VGAM3829 precursor RNA,

herein designated VGAM PRECURSOR RNA, and of the diced VGAM3829 RNA, herein designated VGAM RNA, and a schematic representation of the secondary folding of VGAM3829 folded precursor RNA, herein designated VGAM FOLDED PRECURSOR RNA, of VGAM3829 are further described hereinbelow with reference to Table 1.

[53577] Nucleotide sequences of host target binding sites, such as BINDING SITE-I, BINDING SITE-II and BINDING SITE-III of Fig. 1, found on, and schematic representation of the complementarity of each of these host target binding sites to VGAM3829 RNA, herein designated VGAM RNA, are described hereinbelow with reference to Table 2.

[53578] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3830(VGR3830) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53579] VGR3830 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3830 gene was

detected is described hereinabove with reference to Figs. 6–15.

[53580] VGR3830 gene encodes VGR3830 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53581] VGR3830 precursor RNA folds spatially, forming VGR3830 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3830 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3830 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53582] VGR3830 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2410 precursor RNA, VGAM2411 precursor RNA, VGAM3407 precursor RNA and VGAM3592 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53583] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2410 RNA, VGAM2411 RNA, VGAM3407 RNA and VGAM3592 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53584] VGAM2410 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2410 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2410 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2410 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[53585] VGAM2411 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2411 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2411 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2411 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53586] VGAM3407 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3407 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3407 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3407 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53587] VGAM3592 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3592 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3592 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3592 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53588] It is appreciated that a function of VGR3830 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3830 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3830 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR3830 gene: VGAM2410 host target protein, VGAM2411 host target protein, VGAM3407 host target protein and VGAM3592 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2410, VGAM2411, VGAM3407 and VGAM3592

[53589] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3831(VGR3831) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53590] VGR3831 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3831 gene was detected is described hereinabove with reference to Figs. 6–15.

[53591] VGR3831 gene encodes VGR3831 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[53592] VGR3831 precursor RNA folds spatially, forming VGR3831 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3831 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3831 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53593] VGR3831 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM473 precursor RNA and VGAM474 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53594] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM473 RNA and VGAM474 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53595] VGAM473 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM473 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM473 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM473 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53596] VGAM474 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM474 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM474 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM474 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53597] It is appreciated that a function of VGR3831 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3831 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3831 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3831 gene: VGAM473 host target protein and VGAM474 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM473 and VGAM474

[53598] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3832(VGR3832) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53599] VGR3832 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3832 gene was detected is described hereinabove with reference to Figs. 6-15.

[53600] VGR3832 gene encodes VGR3832 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53601] VGR3832 precursor RNA folds spatially, forming VGR3832 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3832 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3832 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53602] VGR3832 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1012 precursor RNA, VGAM1013 precursor RNA and VGAM3205 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53603] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1012 RNA, VGAM1013 RNA and VGAM3205 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53604] VGAM1012 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1012 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1012 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1012 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53605] VGAM1013 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1013 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1013 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1013 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53606] VGAM3205 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3205 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3205 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3205 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53607] It is appreciated that a function of VGR3832 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3832 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3832 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3832 gene: VGAM1012 host target protein, VGAM1013 host target protein and VGAM3205 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1012, VGAM1013 and VGAM3205

[53608] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3833(VGR3833) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53609] VGR3833 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3833 gene was detected is described hereinabove with reference to Figs. 6–15.

[53610] VGR3833 gene encodes VGR3833 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53611] VGR3833 precursor RNA folds spatially, forming VGR3833 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3833 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3833 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53612] VGR3833 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM485 precursor RNA, VGAM486 precursor RNA, VGAM488 precursor RNA, VGAM489 precursor RNA, VGAM490 precursor RNA, VGAM616 precursor RNA, VGAM617 precursor RNA and VGAM619 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53613] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM485

RNA, VGAM486 RNA, VGAM488 RNA, VGAM489 RNA, VGAM490 RNA, VGAM616 RNA, VGAM617 RNA and VGAM619 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53614] VGAM485 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM485 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM485 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM485 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53615] VGAM486 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM486 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM486 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM486 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53616] VGAM488 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM488 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM488 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM488 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53617] VGAM489 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM489 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM489 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM489 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53618] VGAM490 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM490 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM490 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM490 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53619] VGAM616 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM616 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM616 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM616 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53620] VGAM617 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM617 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM617 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM617 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53621] VGAM619 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM619 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM619 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM619 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53622] It is appreciated that a function of VGR3833 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3833 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3833 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3833 gene: VGAM485 host target protein, VGAM486 host target protein, VGAM488 host target protein, VGAM489 host target protein,

VGAM490 host target protein, VGAM616 host target protein, VGAM617 host target protein and VGAM619 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM485, VGAM486, VGAM488, VGAM489, VGAM490, VGAM616, VGAM617 and VGAM619

[53623] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3834(VGR3834) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53624] VGR3834 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3834 gene was detected is described hereinabove with reference to Figs. 6-15.

[53625] VGR3834 gene encodes VGR3834 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[53626] VGR3834 precursor RNA folds spatially, forming VGR3834 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3834 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3834 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53627] VGR3834 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM620 precursor RNA, VGAM621 precursor RNA, VGAM785 precursor RNA, VGAM936 precursor RNA, VGAM1004 precursor RNA, VGAM1005 precursor RNA, VGAM1006 precursor RNA and VGAM1007 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR re-

spectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53628] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM620 RNA, VGAM621 RNA, VGAM785 RNA, VGAM936 RNA, VGAM1004 RNA, VGAM1005 RNA, VGAM1006 RNA and VGAM1007 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53629] VGAM620 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM620 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM620 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM620 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53630] VGAM621 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM621 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM621 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM621 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53631] VGAM785 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM785 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM785 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM785 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53632] VGAM936 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM936 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM936 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM936 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53633] VGAM1004 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1004 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1004 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM1004 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53634] VGAM1005 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1005 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1005 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1005 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53635] VGAM1006 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1006 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1006 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1006 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53636] VGAM1007 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1007 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1007 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1007 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53637] It is appreciated that a function of VGR3834 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3834 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3834

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3834 gene: VGAM620 host target protein, VGAM621 host target protein, VGAM785 host target protein, VGAM936 host target protein, VGAM1004 host target protein, VGAM1005 host target protein, VGAM1006 host target protein and VGAM1007 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM620, VGAM621, VGAM785, VGAM936, VGAM1004, VGAM1005, VGAM1006 and VGAM1007

[53638] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3835(VGR3835) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53639] VGR3835 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3835 gene was detected is described hereinabove with reference to Figs. 6–15.

[53640] VGR3835 gene encodes VGR3835 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53641] VGR3835 precursor RNA folds spatially, forming VGR3835 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3835 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3835 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53642] VGR3835 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1150 precursor RNA, VGAM1311 precursor RNA, VGAM1312 precursor RNA, VGAM1521 pre–

cursor RNA, VGAM1522 precursor RNA, VGAM1533 precursor RNA, VGAM1537 precursor RNA and VGAM1541 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53643] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1150 RNA, VGAM1311 RNA, VGAM1312 RNA, VGAM1521 RNA, VGAM1522 RNA, VGAM1533 RNA, VGAM1537 RNA and VGAM1541 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53644] VGAM1150 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1150 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1150 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1150 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53645] VGAM1311 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1311 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1311 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1311 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53646] VGAM1312 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1312 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1312 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1312 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53647] VGAM1521 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1521 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1521 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1521 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53648] VGAM1522 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM1522 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1522 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1522 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53649] VGAM1533 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1533 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1533 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1533 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53650] VGAM1537 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1537 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1537 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1537 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53651] VGAM1541 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1541 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1541 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1541 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53652] It is appreciated that a function of VGR3835 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3835 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3835 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3835 gene: VGAM1150 host target protein, VGAM1311 host target protein, VGAM1312 host target protein, VGAM1521 host target protein, VGAM1522 host target protein, VGAM1533 host target protein, VGAM1537 host target protein and VGAM1541 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1150, VGAM1311, VGAM1312, VGAM1521, VGAM1522, VGAM1533, VGAM1537 and VGAM1541

[53653] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3836(VGR3836) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53654] VGR3836 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3836 gene was detected is described hereinabove with reference to Figs. 6–15.

[53655] VGR3836 gene encodes VGR3836 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53656] VGR3836 precursor RNA folds spatially, forming VGR3836 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3836 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3836 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53657] VGR3836 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1542 precursor RNA, VGAM1543 precursor RNA, VGAM2084 precursor RNA, VGAM2359 precursor RNA, VGAM2501 precursor RNA, VGAM2675 precursor RNA, VGAM2693 precursor RNA and VGAM2694 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53658] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1542 RNA, VGAM1543 RNA, VGAM2084 RNA, VGAM2359 RNA, VGAM2501 RNA, VGAM2675 RNA, VGAM2693 RNA and VGAM2694 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53659] VGAM1542 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1542 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1542 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1542 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53660] VGAM1543 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1543 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1543 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM1543 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53661] VGAM2084 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2084 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2084 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2084 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53662] VGAM2359 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2359 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2359 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2359 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53663] VGAM2501 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2501 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2501 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2501 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53664] VGAM2675 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2675 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2675 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2675 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53665] VGAM2693 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2693 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2693 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2693 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53666] VGAM2694 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2694 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2694 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2694 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53667] It is appreciated that a function of VGR3836 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3836 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3836 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3836 gene: VGAM1542 host target protein, VGAM1543 host target protein, VGAM2084 host target protein, VGAM2359 host target protein, VGAM2501 host target protein, VGAM2675 host target protein, VGAM2693 host target protein and VGAM2694 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through

VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1542, VGAM1543, VGAM2084, VGAM2359, VGAM2501, VGAM2675, VGAM2693 and VGAM2694

[53668] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3837(VGR3837) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53669] VGR3837 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3837 gene was detected is described hereinabove with reference to Figs. 6–15.

[53670] VGR3837 gene encodes VGR3837 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53671] VGR3837 precursor RNA folds spatially, forming VGR3837 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR3837 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3837 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53672] VGR3837 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2695 precursor RNA, VGAM2744 precursor RNA, VGAM2833 precursor RNA, VGAM3040 precursor RNA, VGAM3080 precursor RNA, VGAM3115 precursor RNA, VGAM3155 precursor RNA and VGAM3167 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53673] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2695 RNA, VGAM2744 RNA, VGAM2833 RNA, VGAM3040 RNA, VGAM3080 RNA, VGAM3115 RNA, VGAM3155 RNA and VGAM3167 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53674] VGAM2695 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2695 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2695 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2695 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53675] VGAM2744 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2744 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2744 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2744 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53676] VGAM2833 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2833 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2833 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2833 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53677] VGAM3040 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3040 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3040 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3040 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53678] VGAM3080 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3080 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3080 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3080 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[53679] VGAM3115 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3115 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3115 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3115 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53680] VGAM3155 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3155 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3155 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3155 host target protein, herein schematically

represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53681] VGAM3167 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3167 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3167 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3167 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53682] It is appreciated that a function of VGR3837 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3837 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3837 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR3837 gene: VGAM2695 host target protein, VGAM2744 host target protein, VGAM2833 host target protein, VGAM3040 host target protein, VGAM3080 host target protein, VGAM3115 host target protein, VGAM3155 host target protein and VGAM3167 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2695, VGAM2744, VGAM2833, VGAM3040, VGAM3080, VGAM3115, VGAM3155 and VGAM3167

[53683] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3838(VGR3838) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53684] VGR3838 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3838 gene was

detected is described hereinabove with reference to Figs. 6–15.

[53685] VGR3838 gene encodes VGR3838 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53686] VGR3838 precursor RNA folds spatially, forming VGR3838 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3838 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3838 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53687] VGR3838 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3191 precursor RNA, VGAM3458 precursor RNA, VGAM3551 precursor RNA, VGAM3591 precursor RNA, VGAM3615 precursor RNA, VGAM3679 precursor RNA, VGAM3698 precursor RNA and VGAM3730

precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53688] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3191 RNA, VGAM3458 RNA, VGAM3551 RNA, VGAM3591 RNA, VGAM3615 RNA, VGAM3679 RNA, VGAM3698 RNA and VGAM3730 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53689] VGAM3191 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3191 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3191 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3191 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53690] VGAM3458 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3458 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3458 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3458 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53691] VGAM3551 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3551 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3551 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3551 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53692] VGAM3591 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3591 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3591 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3591 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53693] VGAM3615 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3615 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3615 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3615 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53694] VGAM3679 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3679 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3679 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3679 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53695] VGAM3698 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3698 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3698 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3698 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53696] VGAM3730 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3730 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3730 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3730 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53697] It is appreciated that a function of VGR3838 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3838 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3838 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3838 gene: VGAM3191 host target protein, VGAM3458 host target protein, VGAM3551 host target protein, VGAM3591 host target protein, VGAM3615 host target protein, VGAM3679 host target protein, VGAM3698 host target protein and VGAM3730 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3191, VGAM3458, VGAM3551, VGAM3591, VGAM3615, VGAM3679, VGAM3698 and VGAM3730

[53698] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3839(VGR3839) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53699] VGR3839 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3839 gene was detected is described hereinabove with reference to Figs. 6–15.

[53700] VGR3839 gene encodes VGR3839 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53701] VGR3839 precursor RNA folds spatially, forming VGR3839 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3839 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3839 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53702] VGR3839 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3733 precursor RNA, VGAM3754 precursor RNA and VGAM3827 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53703] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3733 RNA, VGAM3754 RNA and VGAM3827 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53704] VGAM3733 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3733 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3733 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3733 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53705] VGAM3754 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3754 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3754 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3754 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53706] VGAM3827 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3827 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3827 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3827 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53707] It is appreciated that a function of VGR3839 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3839 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3839 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3839 gene: VGAM3733 host target protein, VGAM3754 host target protein and VGAM3827 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3733, VGAM3754 and VGAM3827

[53708] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3840(VGR3840) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53709] VGR3840 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3840 gene was detected is described hereinabove with reference to Figs. 6–15.

[53710] VGR3840 gene encodes VGR3840 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53711] VGR3840 precursor RNA folds spatially, forming VGR3840 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3840 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3840 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53712] VGR3840 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2047 precursor RNA, VGAM2048 precursor RNA and VGAM3412 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53713] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2047 RNA, VGAM2048 RNA and VGAM3412 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53714] VGAM2047 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2047 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2047 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2047 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53715] VGAM2048 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2048 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2048 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2048 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53716] VGAM3412 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3412 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3412 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3412 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53717] It is appreciated that a function of VGR3840 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3840 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3840 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3840 gene: VGAM2047 host target protein, VGAM2048 host target protein and VGAM3412 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2047, VGAM2048 and VGAM3412

[53718] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3841(VGR3841) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53719] VGR3841 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3841 gene was detected is described hereinabove with reference to Figs. 6–15.

[53720] VGR3841 gene encodes VGR3841 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53721] VGR3841 precursor RNA folds spatially, forming VGR3841 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3841 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3841 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53722] VGR3841 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM19 precursor RNA, VGAM20 precursor RNA, VGAM25 precursor RNA, VGAM26 precursor RNA, VGAM30 precursor RNA, VGAM31 precursor RNA, VGAM34 precursor RNA and VGAM35 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53723] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM19 RNA, VGAM20 RNA, VGAM25 RNA, VGAM26 RNA, VGAM30 RNA, VGAM31 RNA, VGAM34 RNA and VGAM35 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53724] VGAM19 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM19 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM19 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM19 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53725] VGAM20 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM20 host target RNA, herein schematically represented by VGAM20 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM20 host target RNA, herein schematically represented by VGAM20 HOST TARGET RNA into VGAM20 host target protein, herein schematically represented by VGAM20 HOST TARGET PROTEIN, both of Fig. 1.

[53726] VGAM25 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM25 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM25 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM25 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53727] VGAM26 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM26 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM26 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM26 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53728] VGAM30 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM30 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM30 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM30 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53729] VGAM31 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM31 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM31 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM31 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53730] VGAM34 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM34 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM34 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM34 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[53731] VGAM35 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM35 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM35 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM35 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53732] It is appreciated that a function of VGR3841 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3841 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3841 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3841 gene: VGAM19 host

target protein, VGAM20 host target protein, VGAM25 host target protein, VGAM26 host target protein, VGAM30 host target protein, VGAM31 host target protein, VGAM34 host target protein and VGAM35 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM19, VGAM20, VGAM25, VGAM26, VGAM30, VGAM31, VGAM34 and VGAM35

[53733] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3842(VGR3842) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53734] VGR3842 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3842 gene was detected is described hereinabove with reference to Figs. 6-15.

[53735] VGR3842 gene encodes VGR3842 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53736] VGR3842 precursor RNA folds spatially, forming VGR3842 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3842 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3842 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53737] VGR3842 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM37 precursor RNA, VGAM38 precursor RNA, VGAM39 precursor RNA, VGAM42 precursor RNA, VGAM44 precursor RNA, VGAM47 precursor RNA, VGAM49 precursor RNA and VGAM50 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRE-

CURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53738] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM37 RNA, VGAM38 RNA, VGAM39 RNA, VGAM42 RNA, VGAM44 RNA, VGAM47 RNA, VGAM49 RNA and VGAM50 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53739] VGAM37 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM37 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM37 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM37 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53740] VGAM38 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM38 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM38 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM38 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53741] VGAM39 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM39 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM39 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM39 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53742] VGAM42 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM42 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM42 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM42 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53743] VGAM44 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM44 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM44 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM44 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53744] VGAM47 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM47 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM47 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM47 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53745] VGAM49 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM49 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM49 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM49 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53746] VGAM50 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM50 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM50 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM50 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53747] It is appreciated that a function of VGR3842 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3842 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3842 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3842 gene: VGAM37 host target protein, VGAM38 host target protein, VGAM39 host target protein, VGAM42 host target protein, VGAM44 host target protein, VGAM47 host target protein, VGAM49 host target protein and VGAM50 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM37, VGAM38, VGAM39, VGAM42, VGAM44, VGAM47, VGAM49 and VGAM50

[53748] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3843(VGR3843) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[53749] VGR3843 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3843 gene was detected is described hereinabove with reference to Figs. 6–15.

[53750] VGR3843 gene encodes VGR3843 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53751] VGR3843 precursor RNA folds spatially, forming VGR3843 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3843 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3843 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53752] VGR3843 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM52 precursor RNA, VGAM56 precursor RNA, VGAM60 precursor RNA, VGAM63 precursor RNA, VGAM66 precursor RNA, VGAM115 precursor RNA, VGAM117 precursor RNA and VGAM118 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53753] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM52 RNA, VGAM56 RNA, VGAM60 RNA, VGAM63 RNA, VGAM66 RNA, VGAM115 RNA, VGAM117 RNA and VGAM118 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53754] VGAM52 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM52 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM52 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM52 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53755] VGAM56 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM56 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM56 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM56 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53756] VGAM60 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM60 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM60 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM60 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53757] VGAM63 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM63 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM63 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM63 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53758] VGAM66 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM66 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM66 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM66 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53759] VGAM115 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM115 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM115 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM115 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[53760] VGAM117 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM117 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM117 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM117 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53761] VGAM118 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM118 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM118 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM118 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53762] It is appreciated that a function of VGR3843 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3843 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3843 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3843 gene: VGAM52 host target protein, VGAM56 host target protein, VGAM60 host target protein, VGAM63 host target protein, VGAM66 host target protein, VGAM115 host target protein, VGAM117 host target protein and VGAM118 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM52, VGAM56, VGAM60, VGAM63, VGAM66, VGAM115, VGAM117 and VGAM118

[53763] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3844(VGR3844) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53764] VGR3844 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3844 gene was detected is described hereinabove with reference to Figs. 6–15.

[53765] VGR3844 gene encodes VGR3844 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53766] VGR3844 precursor RNA folds spatially, forming VGR3844 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3844 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3844 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53767] VGR3844 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM121 precursor RNA, VGAM125 precursor RNA, VGAM129 precursor RNA, VGAM134 precursor RNA, VGAM139 precursor RNA, VGAM146 precursor RNA, VGAM367 precursor RNA and VGAM665 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53768] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM121 RNA, VGAM125 RNA, VGAM129 RNA, VGAM134 RNA, VGAM139 RNA, VGAM146 RNA, VGAM367 RNA and VGAM665 RNA respectively, herein schematically repre-

sented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53769] VGAM121 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM121 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM121 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM121 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53770] VGAM125 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM125 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM125 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM125 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53771] VGAM129 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM129 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM129 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM129 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53772] VGAM134 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM134 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM134 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM134 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53773] VGAM139 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM139 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM139 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM139 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53774] VGAM146 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM146 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM146 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM146 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53775] VGAM367 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM367 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM367 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM367 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53776] VGAM665 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM665 host target RNA, herein schematically represented by VGAM8

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM665 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM665 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53777] It is appreciated that a function of VGR3844 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3844 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3844 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3844 gene: VGAM121 host target protein, VGAM125 host target protein, VGAM129 host target protein, VGAM134 host target protein, VGAM139 host target protein, VGAM146 host target protein, VGAM367 host target protein and VGAM665 host target protein, herein schematically represented by

VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM121, VGAM125, VGAM129, VGAM134, VGAM139, VGAM146, VGAM367 and VGAM665

[53778] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3845(VGR3845) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53779] VGR3845 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3845 gene was detected is described hereinabove with reference to Figs. 6-15.

[53780] VGR3845 gene encodes VGR3845 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53781] VGR3845 precursor RNA folds spatially, forming VGR3845 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR3845 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3845 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53782] VGR3845 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM666 precursor RNA, VGAM1465 precursor RNA, VGAM1467 precursor RNA, VGAM1518 precursor RNA, VGAM1664 precursor RNA, VGAM1665 precursor RNA, VGAM1667 precursor RNA and VGAM1721 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53783] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM666 RNA, VGAM1465 RNA, VGAM1467 RNA, VGAM1518 RNA, VGAM1664 RNA, VGAM1665 RNA, VGAM1667 RNA and VGAM1721 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53784] VGAM666 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM666 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM666 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM666 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53785] VGAM1465 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1465 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1465 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1465 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53786] VGAM1467 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1467 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1467 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1467 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53787] VGAM1518 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1518 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1518 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1518 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53788] VGAM1664 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1664 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1664 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1664 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[53789] VGAM1665 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1665 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1665 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1665 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53790] VGAM1667 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1667 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1667 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1667 host target protein, herein schematically

represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53791] VGAM1721 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1721 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1721 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1721 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53792] It is appreciated that a function of VGR3845 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3845 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3845 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR3845 gene: VGAM666 host target protein, VGAM1465 host target protein, VGAM1467 host target protein, VGAM1518 host target protein, VGAM1664 host target protein, VGAM1665 host target protein, VGAM1667 host target protein and VGAM1721 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM666, VGAM1465, VGAM1467, VGAM1518, VGAM1664, VGAM1665, VGAM1667 and VGAM1721

[53793] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3846(VGR3846) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53794] VGR3846 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3846 gene was detected is described hereinabove with reference to Figs.

6-15.

[53795] VGR3846 gene encodes VGR3846 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53796] VGR3846 precursor RNA folds spatially, forming VGR3846 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3846 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3846 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53797] VGR3846 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1723 precursor RNA, VGAM1864 precursor RNA, VGAM2018 precursor RNA, VGAM2061 precursor RNA, VGAM2114 precursor RNA, VGAM2320 precursor RNA, VGAM2327 precursor RNA and VGAM2532 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53798] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1723 RNA, VGAM1864 RNA, VGAM2018 RNA, VGAM2061 RNA, VGAM2114 RNA, VGAM2320 RNA, VGAM2327 RNA and VGAM2532 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53799] VGAM1723 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1723 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1723 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1723 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53800] VGAM1864 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1864 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1864 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1864 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53801] VGAM2018 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2018 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2018 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2018 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53802] VGAM2061 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2061 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2061 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2061 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53803] VGAM2114 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2114 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2114 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2114 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53804] VGAM2320 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2320 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2320 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2320 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53805] VGAM2327 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2327 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2327 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2327 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53806] VGAM2532 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2532 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2532 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2532 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53807] It is appreciated that a function of VGR3846 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR3846 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3846 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3846 gene: VGAM1723 host target protein, VGAM1864 host target protein, VGAM2018 host target protein, VGAM2061 host target protein, VGAM2114 host target protein, VGAM2320 host target protein, VGAM2327 host target protein and VGAM2532 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1723, VGAM1864, VGAM2018, VGAM2061, VGAM2114, VGAM2320, VGAM2327 and VGAM2532

[53808] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3847(VGR3847) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53809] VGR3847 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3847 gene was detected is described hereinabove with reference to Figs. 6–15.

[53810] VGR3847 gene encodes VGR3847 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53811] VGR3847 precursor RNA folds spatially, forming VGR3847 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3847 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3847 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53812] VGR3847 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2558 precursor RNA, VGAM2950 precursor RNA, VGAM2951 precursor RNA, VGAM3116 precursor RNA, VGAM3246 precursor RNA, VGAM3247 precursor RNA, VGAM3423 precursor RNA and VGAM3685 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53813] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2558 RNA, VGAM2950 RNA, VGAM2951 RNA, VGAM3116 RNA, VGAM3246 RNA, VGAM3247 RNA, VGAM3423 RNA and VGAM3685 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53814] VGAM2558 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2558 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2558 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2558 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53815] VGAM2950 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2950 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2950 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2950 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[53816] VGAM2951 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2951 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2951 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2951 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53817] VGAM3116 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3116 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3116 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3116 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53818] VGAM3246 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3246 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3246 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3246 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53819] VGAM3247 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3247 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3247 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM3247 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53820] VGAM3423 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3423 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3423 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3423 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53821] VGAM3685 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3685 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3685 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM3685 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53822] It is appreciated that a function of VGR3847 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3847 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3847 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3847 gene: VGAM2558 host target protein, VGAM2950 host target protein, VGAM2951 host target protein, VGAM3116 host target protein, VGAM3246 host target protein, VGAM3247 host target protein, VGAM3423 host target protein and VGAM3685 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2558, VGAM2950, VGAM2951,

VGAM3116, VGAM3246, VGAM3247, VGAM3423 and VGAM3685

[53823] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3848(VGR3848) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53824] VGR3848 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3848 gene was detected is described hereinabove with reference to Figs. 6–15.

[53825] VGR3848 gene encodes VGR3848 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53826] VGR3848 precursor RNA folds spatially, forming VGR3848 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3848 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3848 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53827] VGR3848 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2742 precursor RNA and VGAM3547 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53828] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2742 RNA and VGAM3547 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53829] VGAM2742 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2742 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2742 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2742 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53830] VGAM3547 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3547 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3547 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3547 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53831] It is appreciated that a function of VGR3848 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3848 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3848 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3848 gene: VGAM2742 host target protein and VGAM3547 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2742 and VGAM3547

[53832] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3849(VGR3849) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53833] VGR3849 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3849 gene was detected is described hereinabove with reference to Figs. 6–15.

[53834] VGR3849 gene encodes VGR3849 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53835] VGR3849 precursor RNA folds spatially, forming VGR3849 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3849 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3849 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53836] VGR3849 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM91 precursor RNA, VGAM92 precursor

RNA, VGAM93 precursor RNA, VGAM101 precursor RNA, VGAM395 precursor RNA, VGAM446 precursor RNA, VGAM447 precursor RNA and VGAM603 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53837] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM91 RNA, VGAM92 RNA, VGAM93 RNA, VGAM101 RNA, VGAM395 RNA, VGAM446 RNA, VGAM447 RNA and VGAM603 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53838] VGAM91 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM91 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM91 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM91 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53839] VGAM92 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM92 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM92 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM92 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53840] VGAM93 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM93 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM93 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM93 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53841] VGAM101 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM101 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM101 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM101 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53842] VGAM395 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM395 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM395 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM395 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53843] VGAM446 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM446 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM446 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM446 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53844] VGAM447 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM447 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM447 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM447 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53845] VGAM603 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM603 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM603 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM603 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[53846] It is appreciated that a function of VGR3849 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3849 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3849 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3849 gene: VGAM91 host target protein, VGAM92 host target protein, VGAM93 host target protein, VGAM101 host target protein, VGAM395 host target protein, VGAM446 host target protein, VGAM447 host target protein and VGAM603 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM91, VGAM92, VGAM93, VGAM101, VGAM395, VGAM446, VGAM447 and VGAM603

[53847] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3850(VGR3850) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53848] VGR3850 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3850 gene was detected is described hereinabove with reference to Figs. 6–15.

[53849] VGR3850 gene encodes VGR3850 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53850] VGR3850 precursor RNA folds spatially, forming VGR3850 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3850 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3850 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53851] VGR3850 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM605 precursor RNA, VGAM949 precursor RNA, VGAM980 precursor RNA, VGAM981 precursor RNA, VGAM987 precursor RNA, VGAM1044 precursor RNA, VGAM1506 precursor RNA and VGAM1507 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53852] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM605 RNA, VGAM949 RNA, VGAM980 RNA, VGAM981 RNA, VGAM987 RNA, VGAM1044 RNA, VGAM1506 RNA and VGAM1507 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53853] VGAM605 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM605 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM605 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM605 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53854] VGAM949 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM949 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM949 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM949 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53855] VGAM980 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM980 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM980 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM980 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53856] VGAM981 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM981 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM981 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM981 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53857] VGAM987 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM987 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM987 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM987 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53858] VGAM1044 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1044 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1044 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1044 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53859] VGAM1506 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1506 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1506 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1506 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53860] VGAM1507 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1507 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1507 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1507 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53861] It is appreciated that a function of VGR3850 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3850 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3850 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3850 gene: VGAM605 host target protein, VGAM949 host target protein, VGAM980 host target protein, VGAM981 host target protein, VGAM987 host target protein, VGAM1044 host target protein, VGAM1506 host target protein and VGAM1507 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM605, VGAM949, VGAM980, VGAM981, VGAM987, VGAM1044, VGAM1506 and VGAM1507

[53862] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3851(VGR3851) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53863] VGR3851 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3851 gene was detected is described hereinabove with reference to Figs. 6–15.

[53864] VGR3851 gene encodes VGR3851 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53865] VGR3851 precursor RNA folds spatially, forming VGR3851 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3851 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3851 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53866] VGR3851 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1508 precursor RNA, VGAM1509 precursor RNA, VGAM1510 precursor RNA, VGAM1511 precursor RNA, VGAM1513 precursor RNA, VGAM1603 precursor RNA, VGAM1720 precursor RNA and VGAM1909 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53867] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1508 RNA, VGAM1509 RNA, VGAM1510 RNA, VGAM1511 RNA, VGAM1513 RNA, VGAM1603 RNA, VGAM1720 RNA and VGAM1909 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53868] VGAM1508 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1508 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1508 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1508 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53869] VGAM1509 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM1509 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1509 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1509 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53870] VGAM1510 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1510 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1510 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1510 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53871] VGAM1511 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1511 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1511 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1511 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53872] VGAM1513 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1513 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1513 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1513 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53873] VGAM1603 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1603 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1603 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1603 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53874] VGAM1720 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1720 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1720 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1720 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[53875] VGAM1909 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1909 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1909 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1909 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53876] It is appreciated that a function of VGR3851 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3851 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3851 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3851 gene: VGAM1508

host target protein, VGAM1509 host target protein, VGAM1510 host target protein, VGAM1511 host target protein, VGAM1513 host target protein, VGAM1603 host target protein, VGAM1720 host target protein and VGAM1909 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1508, VGAM1509, VGAM1510, VGAM1511, VGAM1513, VGAM1603, VGAM1720 and VGAM1909

[53877] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3852(VGR3852) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53878] VGR3852 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3852 gene was detected is described hereinabove with reference to Figs.

6-15.

[53879] VGR3852 gene encodes VGR3852 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53880] VGR3852 precursor RNA folds spatially, forming VGR3852 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3852 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3852 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53881] VGR3852 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1914 precursor RNA, VGAM1951 precursor RNA, VGAM1952 precursor RNA, VGAM1953 precursor RNA, VGAM1954 precursor RNA, VGAM1955 precursor RNA, VGAM1956 precursor RNA and VGAM1957 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53882] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1914 RNA, VGAM1951 RNA, VGAM1952 RNA, VGAM1953 RNA, VGAM1954 RNA, VGAM1955 RNA, VGAM1956 RNA and VGAM1957 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53883] VGAM1914 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1914 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1914 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1914 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53884] VGAM1951 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1951 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1951 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1951 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53885] VGAM1952 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1952 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1952 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1952 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53886] VGAM1953 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1953 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1953 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1953 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53887] VGAM1954 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1954 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1954 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1954 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53888] VGAM1955 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1955 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1955 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1955 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53889] VGAM1956 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1956 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1956 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1956 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53890] VGAM1957 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1957 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1957 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1957 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53891] It is appreciated that a function of VGR3852 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR3852 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3852 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3852 gene: VGAM1914 host target protein, VGAM1951 host target protein, VGAM1952 host target protein, VGAM1953 host target protein, VGAM1954 host target protein, VGAM1955 host target protein, VGAM1956 host target protein and VGAM1957 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1914, VGAM1951, VGAM1952, VGAM1953, VGAM1954, VGAM1955, VGAM1956 and VGAM1957

[53892] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3853(VGR3853) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53893] VGR3853 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3853 gene was detected is described hereinabove with reference to Figs. 6–15.

[53894] VGR3853 gene encodes VGR3853 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53895] VGR3853 precursor RNA folds spatially, forming VGR3853 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3853 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3853 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53896] VGR3853 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1958 precursor RNA, VGAM1959 precursor RNA, VGAM1960 precursor RNA, VGAM2068 precursor RNA, VGAM2069 precursor RNA, VGAM2070 precursor RNA, VGAM2204 precursor RNA and VGAM2396 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53897] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1958 RNA, VGAM1959 RNA, VGAM1960 RNA, VGAM2068 RNA, VGAM2069 RNA, VGAM2070 RNA, VGAM2204 RNA and VGAM2396 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53898] VGAM1958 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1958 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1958 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1958 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53899] VGAM1959 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1959 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1959 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1959 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[53900] VGAM1960 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1960 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1960 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1960 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53901] VGAM2068 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2068 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2068 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2068 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53902] VGAM2069 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2069 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2069 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2069 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53903] VGAM2070 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2070 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2070 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2070 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53904] VGAM2204 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2204 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2204 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2204 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53905] VGAM2396 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2396 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2396 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM2396 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53906] It is appreciated that a function of VGR3853 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3853 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3853 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3853 gene: VGAM1958 host target protein, VGAM1959 host target protein, VGAM1960 host target protein, VGAM2068 host target protein, VGAM2069 host target protein, VGAM2070 host target protein, VGAM2204 host target protein and VGAM2396 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1958, VGAM1959, VGAM1960,

VGAM2068, VGAM2069, VGAM2070, VGAM2204 and VGAM2396

[53907] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3854(VGR3854) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53908] VGR3854 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3854 gene was detected is described hereinabove with reference to Figs. 6–15.

[53909] VGR3854 gene encodes VGR3854 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53910] VGR3854 precursor RNA folds spatially, forming VGR3854 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3854 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3854 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53911] VGR3854 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2397 precursor RNA, VGAM2434 precursor RNA, VGAM2478 precursor RNA, VGAM2479 precursor RNA, VGAM2515 precursor RNA, VGAM2516 precursor RNA, VGAM2603 precursor RNA and VGAM2617 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53912] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2397

RNA, VGAM2434 RNA, VGAM2478 RNA, VGAM2479 RNA, VGAM2515 RNA, VGAM2516 RNA, VGAM2603 RNA and VGAM2617 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53913] VGAM2397 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2397 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2397 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2397 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53914] VGAM2434 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2434 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2434 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2434 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53915] VGAM2478 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2478 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2478 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2478 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53916] VGAM2479 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2479 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2479 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2479 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53917] VGAM2515 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2515 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2515 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2515 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53918] VGAM2516 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM2516 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2516 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2516 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53919] VGAM2603 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2603 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2603 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2603 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53920] VGAM2617 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2617 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2617 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2617 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53921] It is appreciated that a function of VGR3854 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3854 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3854 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3854 gene: VGAM2397 host target protein, VGAM2434 host target protein, VGAM2478 host target protein, VGAM2479 host target

protein, VGAM2515 host target protein, VGAM2516 host target protein, VGAM2603 host target protein and VGAM2617 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2397, VGAM2434, VGAM2478, VGAM2479, VGAM2515, VGAM2516, VGAM2603 and VGAM2617

[53922] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3855(VGR3855) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53923] VGR3855 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3855 gene was detected is described hereinabove with reference to Figs. 6-15.

[53924] VGR3855 gene encodes VGR3855 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53925] VGR3855 precursor RNA folds spatially, forming VGR3855 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3855 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3855 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53926] VGR3855 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2643 precursor RNA, VGAM2657 precursor RNA, VGAM2715 precursor RNA, VGAM2716 precursor RNA, VGAM2746 precursor RNA, VGAM2747 precursor RNA, VGAM2869 precursor RNA and VGAM2870 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53927] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2643 RNA, VGAM2657 RNA, VGAM2715 RNA, VGAM2716 RNA, VGAM2746 RNA, VGAM2747 RNA, VGAM2869 RNA and VGAM2870 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53928] VGAM2643 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2643 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2643 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM2643 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53929] VGAM2657 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2657 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2657 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2657 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53930] VGAM2715 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2715 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2715 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM2715 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53931] VGAM2716 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2716 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2716 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2716 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53932] VGAM2746 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2746 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2746 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2746 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53933] VGAM2747 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2747 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2747 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2747 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53934] VGAM2869 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2869 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2869 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2869 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53935] VGAM2870 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2870 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2870 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2870 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53936] It is appreciated that a function of VGR3855 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3855 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3855 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3855 gene: VGAM2643 host target protein, VGAM2657 host target protein, VGAM2715 host target protein, VGAM2716 host target protein, VGAM2746 host target protein, VGAM2747 host target protein, VGAM2869 host target protein and VGAM2870 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2643, VGAM2657, VGAM2715, VGAM2716, VGAM2746, VGAM2747, VGAM2869 and VGAM2870

[53937] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3856(VGR3856) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[53938] VGR3856 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3856 gene was detected is described hereinabove with reference to Figs. 6–15.

[53939] VGR3856 gene encodes VGR3856 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53940] VGR3856 precursor RNA folds spatially, forming VGR3856 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3856 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3856 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53941] VGR3856 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM2891 precursor RNA, VGAM2907 precursor RNA, VGAM2908 precursor RNA, VGAM3053 precursor RNA, VGAM3054 precursor RNA, VGAM3208 precursor RNA, VGAM3487 precursor RNA and VGAM3488 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53942] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2891 RNA, VGAM2907 RNA, VGAM2908 RNA, VGAM3053 RNA, VGAM3054 RNA, VGAM3208 RNA, VGAM3487 RNA and VGAM3488 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53943] VGAM2891 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2891 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2891 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2891 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53944] VGAM2907 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2907 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2907 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2907 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53945] VGAM2908 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2908 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2908 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2908 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53946] VGAM3053 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3053 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3053 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3053 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53947] VGAM3054 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3054 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3054 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3054 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53948] VGAM3208 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3208 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3208 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3208 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[53949] VGAM3487 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3487 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3487 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3487 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53950] VGAM3488 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3488 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3488 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3488 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[53951] It is appreciated that a function of VGR3856 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3856 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3856 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3856 gene: VGAM2891 host target protein, VGAM2907 host target protein, VGAM2908 host target protein, VGAM3053 host target protein, VGAM3054 host target protein, VGAM3208 host target protein, VGAM3487 host target protein and VGAM3488 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2891, VGAM2907, VGAM2908, VGAM3053, VGAM3054, VGAM3208, VGAM3487 and VGAM3488

[53952] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3857(VGR3857) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53953] VGR3857 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3857 gene was detected is described hereinabove with reference to Figs. 6–15.

[53954] VGR3857 gene encodes VGR3857 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53955] VGR3857 precursor RNA folds spatially, forming VGR3857 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3857 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3857 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53956] VGR3857 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM3530 precursor RNA, VGAM3587 precursor RNA, VGAM3600 precursor RNA, VGAM3655 precursor RNA, VGAM3695 precursor RNA, VGAM3710 precursor RNA and VGAM3761 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53957] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3530 RNA, VGAM3587 RNA, VGAM3600 RNA, VGAM3655 RNA, VGAM3695 RNA, VGAM3710 RNA and VGAM3761 RNA respectively, herein schematically represented by VGAM1

RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53958] VGAM3530 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3530 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3530 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3530 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53959] VGAM3587 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3587 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3587 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM3587 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53960] VGAM3600 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3600 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3600 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3600 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53961] VGAM3655 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3655 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3655 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3655 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53962] VGAM3695 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3695 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3695 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3695 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53963] VGAM3710 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3710 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3710 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3710 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[53964] VGAM3761 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3761 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3761 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3761 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53965] It is appreciated that a function of VGR3857 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3857 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3857 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3857 gene: VGAM3530 host target protein, VGAM3587 host target protein, VGAM3600 host target protein, VGAM3655 host target protein, VGAM3695 host target protein, VGAM3710 host target protein and VGAM3761 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3530, VGAM3587, VGAM3600, VGAM3655, VGAM3695, VGAM3710 and VGAM3761

[53966] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3858(VGR3858) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53967] VGR3858 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3858 gene was detected is described hereinabove with reference to Figs. 6–15.

[53968] VGR3858 gene encodes VGR3858 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53969] VGR3858 precursor RNA folds spatially, forming VGR3858 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3858 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3858 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53970] VGR3858 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2932 precursor RNA and VGAM3572

precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53971] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2932 RNA and VGAM3572 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53972] VGAM2932 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2932 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2932 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2932 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[53973] VGAM3572 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3572 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3572 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3572 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53974] It is appreciated that a function of VGR3858 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3858 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3858 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3858 gene: VGAM2932

host target protein and VGAM3572 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2932 and VGAM3572

[53975] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3859(VGR3859) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53976] VGR3859 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3859 gene was detected is described hereinabove with reference to Figs. 6–15.

[53977] VGR3859 gene encodes VGR3859 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53978] VGR3859 precursor RNA folds spatially, forming VGR3859 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR3859 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3859 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[53979] VGR3859 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2542 precursor RNA and VGAM2879 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53980] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2542 RNA and VGAM2879 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respec-

tively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53981] VGAM2542 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2542 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2542 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2542 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53982] VGAM2879 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2879 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2879 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM2879 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [53983] It is appreciated that a function of VGR3859 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3859 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3859 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3859 gene: VGAM2542 host target protein and VGAM2879 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2542 and VGAM2879
- [53984] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3860(VGR3860) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53985] VGR3860 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3860 gene was detected is described hereinabove with reference to Figs. 6–15.

[53986] VGR3860 gene encodes VGR3860 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[53987] VGR3860 precursor RNA folds spatially, forming VGR3860 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3860 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3860 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[53988] VGR3860 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM95 precursor RNA, VGAM97 precursor RNA, VGAM103 precursor RNA, VGAM104 precursor RNA, VGAM591 precursor RNA, VGAM593 precursor RNA and VGAM594 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[53989] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM95 RNA, VGAM97 RNA, VGAM103 RNA, VGAM104 RNA, VGAM591 RNA, VGAM593 RNA and VGAM594 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[53990] VGAM95 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM95 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM95 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM95 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[53991] VGAM97 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM97 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM97 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM97 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[53992] VGAM103 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM103 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM103 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM103 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[53993] VGAM104 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM104 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM104 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM104 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[53994] VGAM591 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM591 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM591 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM591 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[53995] VGAM593 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM593 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM593 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM593 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[53996] VGAM594 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM594 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM594 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM594 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[53997] It is appreciated that a function of VGR3860 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3860 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3860 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3860 gene: VGAM95 host

target protein, VGAM97 host target protein, VGAM103 host target protein, VGAM104 host target protein, VGAM591 host target protein, VGAM593 host target protein and VGAM594 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM95, VGAM97, VGAM103, VGAM104, VGAM591, VGAM593 and VGAM594

[53998] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3861(VGR3861) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[53999] VGR3861 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3861 gene was detected is described hereinabove with reference to Figs. 6-15.

[54000] VGR3861 gene encodes VGR3861 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54001] VGR3861 precursor RNA folds spatially, forming VGR3861 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3861 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3861 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54002] VGR3861 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1251 precursor RNA, VGAM1329 precursor RNA, VGAM1505 precursor RNA, VGAM1776 precursor RNA, VGAM1777 precursor RNA, VGAM1779 precursor RNA, VGAM1965 precursor RNA and VGAM2077 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54003] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1251 RNA, VGAM1329 RNA, VGAM1505 RNA, VGAM1776 RNA, VGAM1777 RNA, VGAM1779 RNA, VGAM1965 RNA and VGAM2077 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54004] VGAM1251 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1251 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1251 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM1251 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54005] VGAM1329 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1329 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1329 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1329 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54006] VGAM1505 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1505 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1505 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM1505 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54007] VGAM1776 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1776 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1776 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1776 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54008] VGAM1777 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1777 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1777 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1777 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54009] VGAM1779 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1779 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1779 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1779 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54010] VGAM1965 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1965 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1965 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1965 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54011] VGAM2077 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2077 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2077 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2077 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54012] It is appreciated that a function of VGR3861 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3861 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3861 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3861 gene: VGAM1251 host target protein, VGAM1329 host target protein, VGAM1505 host target protein, VGAM1776 host target protein, VGAM1777 host target protein, VGAM1779 host target protein, VGAM1965 host target protein and VGAM2077 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1251, VGAM1329, VGAM1505, VGAM1776, VGAM1777, VGAM1779, VGAM1965 and VGAM2077

[54013] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3862(VGR3862) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[54014] VGR3862 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3862 gene was detected is described hereinabove with reference to Figs. 6–15.

[54015] VGR3862 gene encodes VGR3862 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54016] VGR3862 precursor RNA folds spatially, forming VGR3862 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3862 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3862 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54017] VGR3862 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM2078 precursor RNA, VGAM2079 precursor RNA, VGAM2080 precursor RNA, VGAM2450 precursor RNA, VGAM2464 precursor RNA, VGAM2520 precursor RNA, VGAM2619 precursor RNA and VGAM3453 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54018] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2078 RNA, VGAM2079 RNA, VGAM2080 RNA, VGAM2450 RNA, VGAM2464 RNA, VGAM2520 RNA, VGAM2619 RNA and VGAM3453 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54019] VGAM2078 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2078 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2078 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2078 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54020] VGAM2079 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2079 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2079 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2079 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54021] VGAM2080 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2080 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2080 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2080 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54022] VGAM2450 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2450 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2450 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2450 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54023] VGAM2464 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2464 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2464 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2464 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54024] VGAM2520 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2520 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2520 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2520 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[54025] VGAM2619 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2619 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2619 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2619 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54026] VGAM3453 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3453 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3453 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3453 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54027] It is appreciated that a function of VGR3862 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3862 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3862 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3862 gene: VGAM2078 host target protein, VGAM2079 host target protein,

VGAM2080 host target protein, VGAM2450 host target protein, VGAM2464 host target protein, VGAM2520 host target protein, VGAM2619 host target protein and VGAM3453 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2078, VGAM2079, VGAM2080, VGAM2450, VGAM2464, VGAM2520, VGAM2619 and VGAM3453

[54028] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3863(VGR3863) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54029] VGR3863 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3863 gene was detected is described hereinabove with reference to Figs. 6-15.

[54030] VGR3863 gene encodes VGR3863 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54031] VGR3863 precursor RNA folds spatially, forming VGR3863 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3863 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3863 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54032] VGR3863 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3601 precursor RNA and VGAM3778 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54033] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3601 RNA and VGAM3778 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54034] VGAM3601 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3601 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3601 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3601 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54035] VGAM3778 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3778 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3778 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3778 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54036] It is appreciated that a function of VGR3863 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3863 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3863 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3863 gene: VGAM3601 host target protein and VGAM3778 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3601 and VGAM3778

[54037] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3864(VGR3864) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54038] VGR3864 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3864 gene was detected is described hereinabove with reference to Figs. 6–15.

[54039] VGR3864 gene encodes VGR3864 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54040] VGR3864 precursor RNA folds spatially, forming VGR3864 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3864 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3864 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54041] VGR3864 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2721 precursor RNA and VGAM2722 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54042] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2721 RNA and VGAM2722 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54043] VGAM2721 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2721 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2721 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2721 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54044] VGAM2722 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2722 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2722 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2722 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54045] It is appreciated that a function of VGR3864 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3864 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3864 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3864 gene: VGAM2721 host target protein and VGAM2722 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2721 and VGAM2722

[54046] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3865(VGR3865) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54047] VGR3865 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3865 gene was detected is described hereinabove with reference to Figs. 6–15.

[54048] VGR3865 gene encodes VGR3865 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54049] VGR3865 precursor RNA folds spatially, forming VGR3865 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3865 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3865 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54050] VGR3865 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2074 precursor RNA, VGAM2075 precursor RNA, VGAM2240 precursor RNA and VGAM2241 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54051] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2074 RNA, VGAM2075 RNA, VGAM2240 RNA and VGAM2241 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54052] VGAM2074 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2074 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2074 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2074 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54053] VGAM2075 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2075 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2075 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2075 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54054] VGAM2240 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2240 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2240 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM2240 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54055] VGAM2241 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2241 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2241 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2241 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54056] It is appreciated that a function of VGR3865 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3865 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3865 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3865 gene: VGAM2074 host target protein, VGAM2075 host target protein, VGAM2240 host target protein and VGAM2241 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2074, VGAM2075, VGAM2240 and VGAM2241

[54057] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3866(VGR3866) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54058] VGR3866 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3866 gene was detected is described hereinabove with reference to Figs. 6-15.

[54059] VGR3866 gene encodes VGR3866 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54060] VGR3866 precursor RNA folds spatially, forming VGR3866 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3866 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3866 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54061] VGR3866 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1469 precursor RNA, VGAM1470 precursor RNA, VGAM1471 precursor RNA, VGAM1473 precursor RNA, VGAM1474 precursor RNA, VGAM1475 precursor RNA and VGAM1476 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRE-

CURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54062] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1469 RNA, VGAM1470 RNA, VGAM1471 RNA, VGAM1473 RNA, VGAM1474 RNA, VGAM1475 RNA and VGAM1476 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54063] VGAM1469 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1469 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1469 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1469 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[54064] VGAM1470 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1470 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1470 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1470 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54065] VGAM1471 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1471 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1471 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1471 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54066] VGAM1473 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1473 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1473 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1473 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54067] VGAM1474 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1474 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1474 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM1474 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54068] VGAM1475 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1475 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1475 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1475 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54069] VGAM1476 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1476 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1476 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM1476 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54070] It is appreciated that a function of VGR3866 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3866 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3866 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3866 gene: VGAM1469 host target protein, VGAM1470 host target protein, VGAM1471 host target protein, VGAM1473 host target protein, VGAM1474 host target protein, VGAM1475 host target protein and VGAM1476 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1469, VGAM1470, VGAM1471, VGAM1473, VGAM1474, VGAM1475 and

VGAM1476

[54071] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3867(VGR3867) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54072] VGR3867 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3867 gene was detected is described hereinabove with reference to Figs. 6–15.

[54073] VGR3867 gene encodes VGR3867 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54074] VGR3867 precursor RNA folds spatially, forming VGR3867 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3867 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR3867 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54075] VGR3867 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM3258 precursor RNA, VGAM3259 precursor RNA, VGAM3337 precursor RNA and VGAM3338 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54076] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3258 RNA, VGAM3259 RNA, VGAM3337 RNA and VGAM3338 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to

VGAM RNA of Fig. 8.

[54077] VGAM3258 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3258 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3258 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3258 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54078] VGAM3259 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3259 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3259 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3259 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54079] VGAM3337 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3337 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3337 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3337 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54080] VGAM3338 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3338 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3338 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM3338 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54081] It is appreciated that a function of VGR3867 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3867 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3867 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3867 gene: VGAM3258 host target protein, VGAM3259 host target protein, VGAM3337 host target protein and VGAM3338 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3258, VGAM3259, VGAM3337 and VGAM3338

[54082] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3868(VGR3868) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54083] VGR3868 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3868 gene was detected is described hereinabove with reference to Figs. 6–15.

[54084] VGR3868 gene encodes VGR3868 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54085] VGR3868 precursor RNA folds spatially, forming VGR3868 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3868 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3868 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[54086] VGR3868 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2945 precursor RNA and VGAM2946 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54087] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2945 RNA and VGAM2946 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54088] VGAM2945 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2945 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2945 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2945 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54089] VGAM2946 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2946 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2946 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2946 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54090] It is appreciated that a function of VGR3868 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3868 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3868 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3868 gene: VGAM2945 host target protein and VGAM2946 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2945 and VGAM2946

[54091] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3869(VGR3869) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54092] VGR3869 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3869 gene was detected is described hereinabove with reference to Figs. 6-15.

[54093] VGR3869 gene encodes VGR3869 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54094] VGR3869 precursor RNA folds spatially, forming VGR3869 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3869 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3869 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54095] VGR3869 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2376 precursor RNA, VGAM2392 precursor RNA and VGAM2393 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig.

8.

[54096] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2376 RNA, VGAM2392 RNA and VGAM2393 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54097] VGAM2376 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2376 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2376 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2376 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54098] VGAM2392 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2392 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2392 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2392 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54099] VGAM2393 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2393 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2393 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2393 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54100] It is appreciated that a function of VGR3869 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3869 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3869 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3869 gene: VGAM2376 host target protein, VGAM2392 host target protein and VGAM2393 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2376, VGAM2392 and VGAM2393

[54101] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3870(VGR3870) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54102] VGR3870 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3870 gene was detected is described hereinabove with reference to Figs. 6–15.

[54103] VGR3870 gene encodes VGR3870 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54104] VGR3870 precursor RNA folds spatially, forming VGR3870 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3870 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3870 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54105] VGR3870 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2328 precursor RNA, VGAM2330 precursor RNA and VGAM3549 precursor RNA, herein

schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54106] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2328 RNA, VGAM2330 RNA and VGAM3549 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54107] VGAM2328 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2328 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2328 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2328 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[54108] VGAM2330 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2330 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2330 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2330 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54109] VGAM3549 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3549 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3549 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3549 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54110] It is appreciated that a function of VGR3870 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3870 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3870 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3870 gene: VGAM2328 host target protein, VGAM2330 host target protein and VGAM3549 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2328, VGAM2330 and VGAM3549

[54111] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3871(VGR3871) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54112] VGR3871 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3871 gene was detected is described hereinabove with reference to Figs. 6–15.

[54113] VGR3871 gene encodes VGR3871 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54114] VGR3871 precursor RNA folds spatially, forming VGR3871 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3871 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3871 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54115] VGR3871 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2107 precursor RNA and VGAM2108 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54116] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2107 RNA and VGAM2108 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54117] VGAM2107 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2107 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2107 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2107 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54118] VGAM2108 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2108 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2108 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2108 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54119] It is appreciated that a function of VGR3871 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3871 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3871 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3871 gene: VGAM2107 host target protein and VGAM2108 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2107 and VGAM2108

[54120] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3872(VGR3872) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54121] VGR3872 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3872 gene was detected is described hereinabove with reference to Figs. 6–15.

[54122] VGR3872 gene encodes VGR3872 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[54123] VGR3872 precursor RNA folds spatially, forming VGR3872 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3872 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3872 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54124] VGR3872 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2772 precursor RNA and VGAM3437 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54125] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM2772 RNA and VGAM3437 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54126] VGAM2772 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2772 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2772 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2772 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54127] VGAM3437 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3437 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3437 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3437 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [54128] It is appreciated that a function of VGR3872 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3872 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3872 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3872 gene: VGAM2772 host target protein and VGAM3437 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2772 and VGAM3437
- [54129] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3873(VGR3873) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54130] VGR3873 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3873 gene was detected is described hereinabove with reference to Figs. 6–15.

[54131] VGR3873 gene encodes VGR3873 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54132] VGR3873 precursor RNA folds spatially, forming VGR3873 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3873 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3873 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54133] VGR3873 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3391 precursor RNA and VGAM3392 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54134] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3391 RNA and VGAM3392 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54135] VGAM3391 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3391 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3391 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3391 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54136] VGAM3392 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3392 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3392 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3392 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54137] It is appreciated that a function of VGR3873 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3873 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3873 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3873 gene: VGAM3391 host target protein and VGAM3392 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3391 and VGAM3392

[54138] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3874(VGR3874) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54139] VGR3874 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3874 gene was detected is described hereinabove with reference to Figs.

6-15.

[54140] VGR3874 gene encodes VGR3874 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54141] VGR3874 precursor RNA folds spatially, forming VGR3874 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3874 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3874 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54142] VGR3874 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2736 precursor RNA and VGAM2737 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECUR-

SOR RNA of Fig. 8.

[54143] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2736 RNA and VGAM2737 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54144] VGAM2736 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2736 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2736 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2736 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54145] VGAM2737 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2737 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2737 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2737 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54146] It is appreciated that a function of VGR3874 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3874 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3874 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3874 gene: VGAM2736 host target protein and VGAM2737 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated

hereinabove with reference to VGAM2736 and VGAM2737

[54147] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3875(VGR3875) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54148] VGR3875 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3875 gene was detected is described hereinabove with reference to Figs. 6–15.

[54149] VGR3875 gene encodes VGR3875 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54150] VGR3875 precursor RNA folds spatially, forming VGR3875 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3875 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR3875 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54151] VGR3875 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM777 precursor RNA, VGAM778 precursor RNA, VGAM779 precursor RNA, VGAM780 precursor RNA, VGAM781 precursor RNA and VGAM782 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54152] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM777 RNA, VGAM778 RNA, VGAM779 RNA, VGAM780 RNA, VGAM781 RNA and VGAM782 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA,

VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54153] VGAM777 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM777 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM777 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM777 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54154] VGAM778 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM778 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM778 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM778 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54155] VGAM779 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM779 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM779 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM779 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54156] VGAM780 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM780 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM780 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM780 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54157] VGAM781 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM781 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM781 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM781 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54158] VGAM782 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM782 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM782 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM782 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54159] It is appreciated that a function of VGR3875 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3875 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3875 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3875 gene: VGAM777 host target protein, VGAM778 host target protein, VGAM779 host target protein, VGAM780 host target protein, VGAM781 host target protein and VGAM782 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM777,

VGAM778, VGAM779, VGAM780, VGAM781 and VGAM782

[54160] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3876(VGR3876) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54161] VGR3876 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3876 gene was detected is described hereinabove with reference to Figs. 6–15.

[54162] VGR3876 gene encodes VGR3876 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54163] VGR3876 precursor RNA folds spatially, forming VGR3876 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3876 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR3876 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54164] VGR3876 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM2249 precursor RNA, VGAM2250 precursor RNA, VGAM2251 precursor RNA, VGAM2252 precursor RNA, VGAM2866 precursor RNA and VGAM3711 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54165] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2249 RNA, VGAM2250 RNA, VGAM2251 RNA, VGAM2252 RNA, VGAM2866 RNA and VGAM3711 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA,

VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54166] VGAM2249 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2249 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2249 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2249 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54167] VGAM2250 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2250 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2250 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM2250 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54168] VGAM2251 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2251 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2251 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2251 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54169] VGAM2252 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2252 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2252 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2252 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54170] VGAM2866 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2866 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2866 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2866 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54171] VGAM3711 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3711 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3711 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3711 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54172] It is appreciated that a function of VGR3876 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3876 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3876 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3876 gene: VGAM2249 host target protein, VGAM2250 host target protein, VGAM2251 host target protein, VGAM2252 host target protein, VGAM2866 host target protein and VGAM3711 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to

VGAM2249, VGAM2250, VGAM2251, VGAM2252,
VGAM2866 and VGAM3711

- [54173] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3877(VGR3877) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.
- [54174] VGR3877 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3877 gene was detected is described hereinabove with reference to Figs. 6–15.
- [54175] VGR3877 gene encodes VGR3877 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.
- [54176] VGR3877 precursor RNA folds spatially, forming VGR3877 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3877 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3877 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54177] VGR3877 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2827 precursor RNA and VGAM2828 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54178] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2827 RNA and VGAM2828 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54179] VGAM2827 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2827 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2827 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2827 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54180] VGAM2828 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2828 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2828 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2828 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54181] It is appreciated that a function of VGR3877 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3877 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3877 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3877 gene: VGAM2827 host target protein and VGAM2828 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2827 and VGAM2828

[54182] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3878(VGR3878) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54183] VGR3878 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3878 gene was detected is described hereinabove with reference to Figs. 6–15.

[54184] VGR3878 gene encodes VGR3878 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54185] VGR3878 precursor RNA folds spatially, forming VGR3878 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3878 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3878 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54186] VGR3878 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1661 precursor RNA, VGAM1662 pre–

cursor RNA and VGAM1668 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54187] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1661 RNA, VGAM1662 RNA and VGAM1668 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54188] VGAM1661 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1661 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1661 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1661 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54189] VGAM1662 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1662 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1662 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1662 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54190] VGAM1668 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1668 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1668 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM1668 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54191] It is appreciated that a function of VGR3878 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3878 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3878 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3878 gene: VGAM1661 host target protein, VGAM1662 host target protein and VGAM1668 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1661, VGAM1662 and VGAM1668

[54192] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3879(VGR3879) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54193] VGR3879 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3879 gene was detected is described hereinabove with reference to Figs. 6–15.

[54194] VGR3879 gene encodes VGR3879 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54195] VGR3879 precursor RNA folds spatially, forming VGR3879 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3879 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3879 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54196] VGR3879 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM655 precursor RNA, VGAM656 precursor RNA, VGAM658 precursor RNA, VGAM660 precursor RNA, VGAM2191 precursor RNA, VGAM2607 precursor RNA and VGAM2608 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54197] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM655 RNA, VGAM656 RNA, VGAM658 RNA, VGAM660 RNA, VGAM2191 RNA, VGAM2607 RNA and VGAM2608 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54198] VGAM655 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM655 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM655 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM655 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54199] VGAM656 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM656 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM656 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM656 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54200] VGAM658 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM658 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM658 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM658 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54201] VGAM660 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM660 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM660 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM660 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[54202] VGAM2191 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2191 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2191 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2191 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54203] VGAM2607 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2607 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2607 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2607 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54204] VGAM2608 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2608 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2608 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2608 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54205] It is appreciated that a function of VGR3879 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3879 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3879 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR3879 gene: VGAM655 host target protein, VGAM656 host target protein, VGAM658 host target protein, VGAM660 host target protein, VGAM2191 host target protein, VGAM2607 host target protein and VGAM2608 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM655, VGAM656, VGAM658, VGAM660, VGAM2191, VGAM2607 and VGAM2608

[54206] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3880(VGR3880) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54207] VGR3880 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3880 gene was detected is described hereinabove with reference to Figs.

6-15.

[54208] VGR3880 gene encodes VGR3880 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54209] VGR3880 precursor RNA folds spatially, forming VGR3880 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3880 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3880 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54210] VGR3880 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1282 precursor RNA and VGAM1283 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECUR-

SOR RNA of Fig. 8.

[54211] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1282 RNA and VGAM1283 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54212] VGAM1282 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1282 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1282 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1282 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54213] VGAM1283 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1283 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1283 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1283 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54214] It is appreciated that a function of VGR3880 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3880 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3880 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3880 gene: VGAM1282 host target protein and VGAM1283 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated

hereinabove with reference to VGAM1282 and VGAM1283

[54215] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3881(VGR3881) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54216] VGR3881 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3881 gene was detected is described hereinabove with reference to Figs. 6–15.

[54217] VGR3881 gene encodes VGR3881 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54218] VGR3881 precursor RNA folds spatially, forming VGR3881 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3881 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR3881 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54219] VGR3881 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3035 precursor RNA and VGAM3045 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54220] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3035 RNA and VGAM3045 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54221] VGAM3035 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM3035 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3035 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3035 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54222] VGAM3045 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3045 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3045 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3045 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54223] It is appreciated that a function of VGR3881 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3881 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3881 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3881 gene: VGAM3035 host target protein and VGAM3045 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3035 and VGAM3045

[54224] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3882(VGR3882) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54225] VGR3882 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3882 gene was detected is described hereinabove with reference to Figs. 6–15.

[54226] VGR3882 gene encodes VGR3882 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54227] VGR3882 precursor RNA folds spatially, forming VGR3882 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3882 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3882 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54228] VGR3882 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1554 precursor RNA, VGAM1778 precursor RNA, VGAM1782 precursor RNA, VGAM2480 pre–

cursor RNA, VGAM2917 precursor RNA and VGAM3294 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54229] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1554 RNA, VGAM1778 RNA, VGAM1782 RNA, VGAM2480 RNA, VGAM2917 RNA and VGAM3294 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54230] VGAM1554 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1554 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1554 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1554 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54231] VGAM1778 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1778 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1778 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1778 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54232] VGAM1782 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1782 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1782 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1782 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54233] VGAM2480 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2480 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2480 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2480 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54234] VGAM2917 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2917 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2917 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2917 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54235] VGAM3294 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3294 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3294 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3294 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54236] It is appreciated that a function of VGR3882 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3882 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3882 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3882 gene: VGAM1554 host target protein, VGAM1778 host target protein, VGAM1782 host target protein, VGAM2480 host target protein, VGAM2917 host target protein and VGAM3294 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1554, VGAM1778, VGAM1782, VGAM2480, VGAM2917 and VGAM3294

[54237] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3883(VGR3883) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54238] VGR3883 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3883 gene was detected is described hereinabove with reference to Figs. 6–15.

[54239] VGR3883 gene encodes VGR3883 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54240] VGR3883 precursor RNA folds spatially, forming VGR3883 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3883 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3883 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54241] VGR3883 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM257 precursor RNA, VGAM259 precursor

sor RNA, VGAM539 precursor RNA, VGAM540 precursor RNA, VGAM543 precursor RNA, VGAM2020 precursor RNA, VGAM2021 precursor RNA and VGAM2023 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54242] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM257 RNA, VGAM259 RNA, VGAM539 RNA, VGAM540 RNA, VGAM543 RNA, VGAM2020 RNA, VGAM2021 RNA and VGAM2023 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54243] VGAM257 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM257 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM257 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM257 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54244] VGAM259 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM259 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM259 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM259 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54245] VGAM539 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM539 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM539 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM539 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54246] VGAM540 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM540 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM540 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM540 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54247] VGAM543 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM543 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM543 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM543 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54248] VGAM2020 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2020 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2020 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2020 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54249] VGAM2021 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2021 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2021 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2021 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54250] VGAM2023 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2023 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2023 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2023 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[54251] It is appreciated that a function of VGR3883 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3883 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3883 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3883 gene: VGAM257 host target protein, VGAM259 host target protein, VGAM539 host target protein, VGAM540 host target protein, VGAM543 host target protein, VGAM2020 host target protein, VGAM2021 host target protein and VGAM2023 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM257, VGAM259, VGAM539, VGAM540, VGAM543, VGAM2020, VGAM2021 and VGAM2023

[54252] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3884(VGR3884) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54253] VGR3884 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3884 gene was detected is described hereinabove with reference to Figs. 6–15.

[54254] VGR3884 gene encodes VGR3884 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54255] VGR3884 precursor RNA folds spatially, forming VGR3884 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3884 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3884 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54256] VGR3884 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2403 precursor RNA, VGAM3019 precursor RNA and VGAM3780 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54257] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2403 RNA, VGAM3019 RNA and VGAM3780 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54258] VGAM2403 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2403 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2403 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2403 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54259] VGAM3019 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3019 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3019 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3019 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54260] VGAM3780 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3780 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3780 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3780 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54261] It is appreciated that a function of VGR3884 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3884 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3884 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3884 gene: VGAM2403 host target protein, VGAM3019 host target protein and VGAM3780 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM2403, VGAM3019 and VGAM3780

[54262] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3885(VGR3885) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54263] VGR3885 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3885 gene was detected is described hereinabove with reference to Figs. 6–15.

[54264] VGR3885 gene encodes VGR3885 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54265] VGR3885 precursor RNA folds spatially, forming VGR3885 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3885 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3885 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54266] VGR3885 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1117 precursor RNA and VGAM1118 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54267] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1117 RNA and VGAM1118 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54268] VGAM1117 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1117 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1117 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1117 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54269] VGAM1118 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1118 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1118 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1118 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54270] It is appreciated that a function of VGR3885 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3885 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3885 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3885 gene: VGAM1117 host target protein and VGAM1118 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1117 and VGAM1118

[54271] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3886(VGR3886) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54272] VGR3886 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3886 gene was detected is described hereinabove with reference to Figs. 6–15.

[54273] VGR3886 gene encodes VGR3886 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54274] VGR3886 precursor RNA folds spatially, forming VGR3886 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3886 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3886 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54275] VGR3886 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM195 precursor RNA, VGAM196 precursor

sor RNA, VGAM197 precursor RNA, VGAM198 precursor RNA, VGAM201 precursor RNA, VGAM203 precursor RNA, VGAM205 precursor RNA and VGAM208 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54276] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM195 RNA, VGAM196 RNA, VGAM197 RNA, VGAM198 RNA, VGAM201 RNA, VGAM203 RNA, VGAM205 RNA and VGAM208 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54277] VGAM195 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM195 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM195 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM195 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54278] VGAM196 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM196 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM196 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM196 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54279] VGAM197 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM197 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM197 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM197 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54280] VGAM198 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM198 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM198 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM198 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54281] VGAM201 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM201 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM201 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM201 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54282] VGAM203 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM203 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM203 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM203 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54283] VGAM205 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM205 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM205 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM205 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54284] VGAM208 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM208 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM208 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM208 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[54285] It is appreciated that a function of VGR3886 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3886 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3886 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3886 gene: VGAM195 host target protein, VGAM196 host target protein, VGAM197 host target protein, VGAM198 host target protein, VGAM201 host target protein, VGAM203 host target protein, VGAM205 host target protein and VGAM208 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM195, VGAM196, VGAM197, VGAM198, VGAM201, VGAM203, VGAM205 and VGAM208

[54286] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3887(VGR3887) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54287] VGR3887 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3887 gene was detected is described hereinabove with reference to Figs. 6-15.

[54288] VGR3887 gene encodes VGR3887 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54289] VGR3887 precursor RNA folds spatially, forming VGR3887 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3887 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3887 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54290] VGR3887 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM213 precursor RNA, VGAM214 precursor RNA, VGAM215 precursor RNA, VGAM217 precursor RNA, VGAM220 precursor RNA, VGAM221 precursor RNA, VGAM368 precursor RNA and VGAM369 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54291] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM213 RNA, VGAM214 RNA, VGAM215 RNA, VGAM217 RNA, VGAM220 RNA, VGAM221 RNA, VGAM368 RNA and VGAM369 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54292] VGAM213 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM213 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM213 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM213 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54293] VGAM214 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM214 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM214 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM214 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54294] VGAM215 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM215 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM215 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM215 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54295] VGAM217 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM217 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM217 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM217 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54296] VGAM220 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM220 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM220 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM220 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54297] VGAM221 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM221 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM221 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM221 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54298] VGAM368 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM368 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM368 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM368 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54299] VGAM369 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM369 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM369 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM369 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54300] It is appreciated that a function of VGR3887 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3887 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3887 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3887 gene: VGAM213 host target protein, VGAM214 host target protein, VGAM215 host target protein, VGAM217 host target protein, VGAM220 host target protein, VGAM221 host target protein, VGAM368 host target protein and VGAM369 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM213, VGAM214, VGAM215, VGAM217, VGAM220, VGAM221, VGAM368 and VGAM369

[54301] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3888(VGR3888) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54302] VGR3888 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3888 gene was detected is described hereinabove with reference to Figs. 6–15.

[54303] VGR3888 gene encodes VGR3888 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54304] VGR3888 precursor RNA folds spatially, forming VGR3888 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3888 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3888 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54305] VGR3888 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM370 precursor RNA, VGAM371 precursor RNA, VGAM372 precursor RNA, VGAM375 precursor RNA, VGAM377 precursor RNA, VGAM378 precursor RNA, VGAM379 precursor RNA and VGAM380 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54306] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM370 RNA, VGAM371 RNA, VGAM372 RNA, VGAM375 RNA, VGAM377 RNA, VGAM378 RNA, VGAM379 RNA and VGAM380 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54307] VGAM370 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM370 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM370 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM370 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54308] VGAM371 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM371 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM371 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM371 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54309] VGAM372 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM372 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM372 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM372 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54310] VGAM375 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM375 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM375 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM375 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54311] VGAM377 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM377 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM377 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM377 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54312] VGAM378 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM378 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM378 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM378 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54313] VGAM379 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM379 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM379 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM379 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[54314] VGAM380 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM380 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM380 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM380 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54315] It is appreciated that a function of VGR3888 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3888 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3888 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3888 gene: VGAM370 host

target protein, VGAM371 host target protein, VGAM372 host target protein, VGAM375 host target protein, VGAM377 host target protein, VGAM378 host target protein, VGAM379 host target protein and VGAM380 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM370, VGAM371, VGAM372, VGAM375, VGAM377, VGAM378, VGAM379 and VGAM380

[54316] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3889(VGR3889) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54317] VGR3889 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3889 gene was detected is described hereinabove with reference to Figs. 6-15.

- [54318] VGR3889 gene encodes VGR3889 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.
- [54319] VGR3889 precursor RNA folds spatially, forming VGR3889 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3889 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3889 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.
- [54320] VGR3889 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM381 precursor RNA, VGAM382 precursor RNA, VGAM383 precursor RNA, VGAM384 precursor RNA, VGAM385 precursor RNA, VGAM386 precursor RNA, VGAM596 precursor RNA and VGAM1218 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRE-

CURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54321] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM381 RNA, VGAM382 RNA, VGAM383 RNA, VGAM384 RNA, VGAM385 RNA, VGAM386 RNA, VGAM596 RNA and VGAM1218 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54322] VGAM381 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM381 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM381 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM381 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54323] VGAM382 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM382 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM382 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM382 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54324] VGAM383 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM383 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM383 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM383 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54325] VGAM384 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM384 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM384 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM384 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54326] VGAM385 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM385 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM385 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM385 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54327] VGAM386 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM386 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM386 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM386 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54328] VGAM596 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM596 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM596 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM596 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54329] VGAM1218 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1218 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1218 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1218 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54330] It is appreciated that a function of VGR3889 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3889 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3889 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3889 gene: VGAM381 host target protein, VGAM382 host target protein, VGAM383 host target protein, VGAM384 host target protein, VGAM385 host target protein, VGAM386 host target protein, VGAM596 host target protein and VGAM1218 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM381, VGAM382, VGAM383, VGAM384, VGAM385, VGAM386, VGAM596 and VGAM1218

[54331] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3890(VGR3890) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[54332] VGR3890 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3890 gene was detected is described hereinabove with reference to Figs. 6–15.

[54333] VGR3890 gene encodes VGR3890 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54334] VGR3890 precursor RNA folds spatially, forming VGR3890 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3890 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3890 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54335] VGR3890 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM1360 precursor RNA, VGAM1361 precursor RNA, VGAM1402 precursor RNA, VGAM1403 precursor RNA, VGAM1405 precursor RNA, VGAM1406 precursor RNA, VGAM1408 precursor RNA and VGAM1899 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54336] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1360 RNA, VGAM1361 RNA, VGAM1402 RNA, VGAM1403 RNA, VGAM1405 RNA, VGAM1406 RNA, VGAM1408 RNA and VGAM1899 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54337] VGAM1360 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM1360 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1360 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1360 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54338] VGAM1361 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1361 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1361 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1361 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54339] VGAM1402 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1402 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1402 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1402 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54340] VGAM1403 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1403 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1403 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1403 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54341] VGAM1405 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1405 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1405 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1405 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54342] VGAM1406 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1406 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1406 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1406 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[54343] VGAM1408 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1408 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1408 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1408 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54344] VGAM1899 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1899 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1899 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1899 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54345] It is appreciated that a function of VGR3890 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3890 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3890 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3890 gene: VGAM1360 host target protein, VGAM1361 host target protein, VGAM1402 host target protein, VGAM1403 host target protein, VGAM1405 host target protein, VGAM1406 host target protein, VGAM1408 host target protein and VGAM1899 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1360, VGAM1361, VGAM1402, VGAM1403, VGAM1405, VGAM1406, VGAM1408 and VGAM1899

[54346] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3891(VGR3891) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54347] VGR3891 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3891 gene was detected is described hereinabove with reference to Figs. 6–15.

[54348] VGR3891 gene encodes VGR3891 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54349] VGR3891 precursor RNA folds spatially, forming VGR3891 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3891 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3891 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54350] VGR3891 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1929 precursor RNA, VGAM1931 precursor RNA, VGAM2467 precursor RNA, VGAM2468 precursor RNA, VGAM2511 precursor RNA, VGAM2893 precursor RNA, VGAM2894 precursor RNA and VGAM2895 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54351] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1929 RNA, VGAM1931 RNA, VGAM2467 RNA, VGAM2468 RNA, VGAM2511 RNA, VGAM2893 RNA, VGAM2894 RNA and

VGAM2895 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54352] VGAM1929 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1929 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1929 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1929 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54353] VGAM1931 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1931 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1931 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1931 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54354] VGAM2467 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2467 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2467 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2467 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54355] VGAM2468 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2468 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2468 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2468 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54356] VGAM2511 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2511 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2511 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2511 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54357] VGAM2893 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2893 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2893 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2893 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54358] VGAM2894 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2894 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2894 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2894 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54359] VGAM2895 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2895 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2895 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2895 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54360] It is appreciated that a function of VGR3891 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3891 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3891 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3891 gene: VGAM1929 host target protein, VGAM1931 host target protein, VGAM2467 host target protein, VGAM2468 host target protein, VGAM2511 host target protein, VGAM2893 host target protein, VGAM2894 host target protein and

VGAM2895 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1929, VGAM1931, VGAM2467, VGAM2468, VGAM2511, VGAM2893, VGAM2894 and VGAM2895

[54361] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3892(VGR3892) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54362] VGR3892 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3892 gene was detected is described hereinabove with reference to Figs. 6-15.

[54363] VGR3892 gene encodes VGR3892 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54364] VGR3892 precursor RNA folds spatially, forming VGR3892 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3892 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3892 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54365] VGR3892 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3050 precursor RNA, VGAM3386 precursor RNA, VGAM3605 precursor RNA, VGAM3716 precursor RNA, VGAM3742 precursor RNA, VGAM3743 precursor RNA, VGAM3783 precursor RNA and VGAM3796 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54366] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3050 RNA, VGAM3386 RNA, VGAM3605 RNA, VGAM3716 RNA, VGAM3742 RNA, VGAM3743 RNA, VGAM3783 RNA and VGAM3796 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54367] VGAM3050 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3050 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3050 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3050 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[54368] VGAM3386 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3386 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3386 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3386 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54369] VGAM3605 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3605 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3605 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3605 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54370] VGAM3716 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3716 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3716 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3716 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54371] VGAM3742 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3742 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3742 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM3742 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54372] VGAM3743 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3743 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3743 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3743 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54373] VGAM3783 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3783 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3783 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM3783 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54374] VGAM3796 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3796 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3796 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3796 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54375] It is appreciated that a function of VGR3892 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3892 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3892 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3892 gene: VGAM3050 host target protein, VGAM3386 host target protein, VGAM3605 host target protein, VGAM3716 host target protein, VGAM3742 host target protein, VGAM3743 host target protein, VGAM3783 host target protein and VGAM3796 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3050, VGAM3386, VGAM3605, VGAM3716, VGAM3742, VGAM3743, VGAM3783 and VGAM3796

[54376] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3893(VGR3893) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54377] VGR3893 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3893 gene was detected is described hereinabove with reference to Figs. 6–15.

[54378] VGR3893 gene encodes VGR3893 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54379] VGR3893 precursor RNA folds spatially, forming VGR3893 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3893 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3893 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54380] VGR3893 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM387 precursor RNA, VGAM388 precursor RNA, VGAM390 precursor RNA, VGAM391 precursor

RNA, VGAM392 precursor RNA, VGAM393 precursor RNA, VGAM514 precursor RNA and VGAM1341 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54381] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM387 RNA, VGAM388 RNA, VGAM390 RNA, VGAM391 RNA, VGAM392 RNA, VGAM393 RNA, VGAM514 RNA and VGAM1341 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54382] VGAM387 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM387 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM387 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM387 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54383] VGAM388 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM388 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM388 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM388 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54384] VGAM390 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM390 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM390 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM390 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54385] VGAM391 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM391 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM391 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM391 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54386] VGAM392 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM392 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM392 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM392 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54387] VGAM393 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM393 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM393 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM393 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54388] VGAM514 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM514 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM514 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM514 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54389] VGAM1341 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1341 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1341 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1341 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54390] It is appreciated that a function of VGR3893 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3893 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3893 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3893 gene: VGAM387 host target protein, VGAM388 host target protein, VGAM390 host target protein, VGAM391 host target protein, VGAM392 host target protein, VGAM393 host target protein, VGAM514 host target protein and VGAM1341 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM387, VGAM388, VGAM390, VGAM391, VGAM392, VGAM393, VGAM514 and VGAM1341

[54391] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3894(VGR3894) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54392] VGR3894 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3894 gene was detected is described hereinabove with reference to Figs. 6–15.

[54393] VGR3894 gene encodes VGR3894 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54394] VGR3894 precursor RNA folds spatially, forming VGR3894 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3894 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3894 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[54395] VGR3894 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1344 precursor RNA, VGAM1553 precursor RNA, VGAM1695 precursor RNA, VGAM1725 precursor RNA, VGAM1726 precursor RNA, VGAM1727 precursor RNA, VGAM1740 precursor RNA and VGAM1743 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54396] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1344 RNA, VGAM1553 RNA, VGAM1695 RNA, VGAM1725 RNA, VGAM1726 RNA, VGAM1727 RNA, VGAM1740 RNA and VGAM1743 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54397] VGAM1344 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1344 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1344 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1344 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54398] VGAM1553 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1553 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1553 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1553 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54399] VGAM1695 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1695 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1695 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1695 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54400] VGAM1725 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1725 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1725 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1725 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54401] VGAM1726 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1726 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1726 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1726 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54402] VGAM1727 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1727 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1727 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1727 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54403] VGAM1740 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1740 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1740 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1740 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54404] VGAM1743 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1743 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1743 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1743 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54405] It is appreciated that a function of VGR3894 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3894 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3894 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3894 gene: VGAM1344 host target protein, VGAM1553 host target protein, VGAM1695 host target protein, VGAM1725 host target protein, VGAM1726 host target protein, VGAM1727 host target protein, VGAM1740 host target protein and VGAM1743 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1344, VGAM1553, VGAM1695, VGAM1725, VGAM1726, VGAM1727, VGAM1740 and VGAM1743

[54406] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3895(VGR3895) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54407] VGR3895 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3895 gene was detected is described hereinabove with reference to Figs. 6–15.

[54408] VGR3895 gene encodes VGR3895 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54409] VGR3895 precursor RNA folds spatially, forming VGR3895 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3895 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3895 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54410] VGR3895 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1745 precursor RNA, VGAM1845 precursor RNA, VGAM1847 precursor RNA, VGAM1848 precursor RNA, VGAM1977 precursor RNA, VGAM2005 precursor RNA, VGAM2071 precursor RNA and VGAM2076 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54411] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1745 RNA, VGAM1845 RNA, VGAM1847 RNA, VGAM1848 RNA, VGAM1977 RNA, VGAM2005 RNA, VGAM2071 RNA and VGAM2076 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54412] VGAM1745 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1745 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1745 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1745 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54413] VGAM1845 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM1845 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1845 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1845 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54414] VGAM1847 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1847 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1847 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1847 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54415] VGAM1848 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1848 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1848 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1848 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54416] VGAM1977 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1977 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1977 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1977 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54417] VGAM2005 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2005 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2005 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2005 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54418] VGAM2071 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2071 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2071 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2071 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[54419] VGAM2076 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2076 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2076 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2076 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54420] It is appreciated that a function of VGR3895 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3895 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3895 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3895 gene: VGAM1745

host target protein, VGAM1845 host target protein, VGAM1847 host target protein, VGAM1848 host target protein, VGAM1977 host target protein, VGAM2005 host target protein, VGAM2071 host target protein and VGAM2076 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1745, VGAM1845, VGAM1847, VGAM1848, VGAM1977, VGAM2005, VGAM2071 and VGAM2076

[54421] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3896(VGR3896) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54422] VGR3896 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3896 gene was detected is described hereinabove with reference to Figs.

6-15.

[54423] VGR3896 gene encodes VGR3896 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54424] VGR3896 precursor RNA folds spatially, forming VGR3896 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3896 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3896 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54425] VGR3896 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM2554 precursor RNA, VGAM2666 precursor RNA, VGAM2813 precursor RNA, VGAM2814 precursor RNA, VGAM3112 precursor RNA, VGAM3409 precursor RNA and VGAM3795 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2

PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54426] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2554 RNA, VGAM2666 RNA, VGAM2813 RNA, VGAM2814 RNA, VGAM3112 RNA, VGAM3409 RNA and VGAM3795 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54427] VGAM2554 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2554 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2554 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM2554 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54428] VGAM2666 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2666 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2666 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2666 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54429] VGAM2813 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2813 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2813 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM2813 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54430] VGAM2814 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2814 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2814 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2814 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54431] VGAM3112 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3112 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3112 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3112 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54432] VGAM3409 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3409 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3409 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3409 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54433] VGAM3795 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3795 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3795 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3795 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54434] It is appreciated that a function of VGR3896 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3896 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3896 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3896 gene: VGAM2554 host target protein, VGAM2666 host target protein, VGAM2813 host target protein, VGAM2814 host target protein, VGAM3112 host target protein, VGAM3409 host target protein and VGAM3795 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated

hereinabove with reference to VGAM2554, VGAM2666, VGAM2813, VGAM2814, VGAM3112, VGAM3409 and VGAM3795

[54435] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3897(VGR3897) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54436] VGR3897 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3897 gene was detected is described hereinabove with reference to Figs. 6–15.

[54437] VGR3897 gene encodes VGR3897 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54438] VGR3897 precursor RNA folds spatially, forming VGR3897 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3897 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3897 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54439] VGR3897 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM717 precursor RNA, VGAM718 precursor RNA, VGAM769 precursor RNA, VGAM770 precursor RNA, VGAM772 precursor RNA and VGAM3139 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54440] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM717 RNA, VGAM718 RNA, VGAM769 RNA, VGAM770 RNA,

VGAM772 RNA and VGAM3139 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54441] VGAM717 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM717 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM717 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM717 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54442] VGAM718 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM718 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM718 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM718 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54443] VGAM769 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM769 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM769 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM769 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54444] VGAM770 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM770 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM770 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM770 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54445] VGAM772 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM772 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM772 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM772 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54446] VGAM3139 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3139 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3139 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3139 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54447] It is appreciated that a function of VGR3897 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3897 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3897 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3897 gene: VGAM717 host target protein, VGAM718 host target protein, VGAM769 host target protein, VGAM770 host target protein, VGAM772 host target protein and VGAM3139 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN

respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM717, VGAM718, VGAM769, VGAM770, VGAM772 and VGAM3139

[54448] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3898(VGR3898) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54449] VGR3898 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3898 gene was detected is described hereinabove with reference to Figs. 6–15.

[54450] VGR3898 gene encodes VGR3898 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54451] VGR3898 precursor RNA folds spatially, forming VGR3898 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3898 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3898 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54452] VGR3898 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM982 precursor RNA, VGAM983 precursor RNA, VGAM984 precursor RNA, VGAM985 precursor RNA, VGAM2575 precursor RNA, VGAM3111 precursor RNA and VGAM3628 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54453] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM982 RNA, VGAM983 RNA, VGAM984 RNA, VGAM985 RNA, VGAM2575 RNA, VGAM3111 RNA and VGAM3628 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54454] VGAM982 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM982 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM982 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM982 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54455] VGAM983 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM983 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM983 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM983 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54456] VGAM984 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM984 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM984 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM984 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54457] VGAM985 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM985 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM985 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM985 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54458] VGAM2575 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2575 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2575 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2575 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54459] VGAM3111 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM3111 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3111 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3111 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54460] VGAM3628 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3628 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3628 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3628 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54461] It is appreciated that a function of VGR3898 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3898 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3898 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3898 gene: VGAM982 host target protein, VGAM983 host target protein, VGAM984 host target protein, VGAM985 host target protein, VGAM2575 host target protein, VGAM3111 host target protein and VGAM3628 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM982, VGAM983, VGAM984, VGAM985, VGAM2575, VGAM3111 and VGAM3628

[54462] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3899(VGR3899) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54463] VGR3899 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3899 gene was detected is described hereinabove with reference to Figs. 6–15.

[54464] VGR3899 gene encodes VGR3899 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54465] VGR3899 precursor RNA folds spatially, forming VGR3899 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3899 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3899 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54466] VGR3899 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3008 precursor RNA and VGAM3041 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54467] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3008 RNA and VGAM3041 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54468] VGAM3008 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3008 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3008 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3008 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54469] VGAM3041 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3041 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3041 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3041 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54470] It is appreciated that a function of VGR3899 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3899 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3899

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3899 gene: VGAM3008 host target protein and VGAM3041 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3008 and VGAM3041

[54471] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3900(VGR3900) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54472] VGR3900 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3900 gene was detected is described hereinabove with reference to Figs. 6-15.

[54473] VGR3900 gene encodes VGR3900 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54474] VGR3900 precursor RNA folds spatially, forming VGR3900 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3900 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3900 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54475] VGR3900 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1962 precursor RNA, VGAM2990 precursor RNA and VGAM3493 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54476] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1962 RNA, VGAM2990 RNA and VGAM3493 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54477] VGAM1962 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1962 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1962 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1962 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54478] VGAM2990 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2990 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2990 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2990 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54479] VGAM3493 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3493 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3493 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3493 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54480] It is appreciated that a function of VGR3900 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR3900 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3900 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3900 gene: VGAM1962 host target protein, VGAM2990 host target protein and VGAM3493 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1962, VGAM2990 and VGAM3493

[54481] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3901(VGR3901) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54482] VGR3901 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3901 gene was detected is described hereinabove with reference to Figs. 6–15.

[54483] VGR3901 gene encodes VGR3901 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54484] VGR3901 precursor RNA folds spatially, forming VGR3901 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3901 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3901 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54485] VGR3901 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2337 precursor RNA, VGAM2338 precursor RNA and VGAM3470 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2

PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54486] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2337 RNA, VGAM2338 RNA and VGAM3470 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54487] VGAM2337 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2337 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2337 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2337 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54488] VGAM2338 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2338 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2338 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2338 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54489] VGAM3470 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3470 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3470 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3470 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[54490] It is appreciated that a function of VGR3901 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3901 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3901 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3901 gene: VGAM2337 host target protein, VGAM2338 host target protein and VGAM3470 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2337, VGAM2338 and VGAM3470

[54491] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3902(VGR3902) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[54492] VGR3902 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3902 gene was detected is described hereinabove with reference to Figs. 6–15.

[54493] VGR3902 gene encodes VGR3902 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54494] VGR3902 precursor RNA folds spatially, forming VGR3902 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3902 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3902 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54495] VGR3902 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM3088 precursor RNA, VGAM3089 precursor RNA, VGAM3255 precursor RNA, VGAM3408 precursor RNA and VGAM3444 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54496] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3088 RNA, VGAM3089 RNA, VGAM3255 RNA, VGAM3408 RNA and VGAM3444 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54497] VGAM3088 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3088 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3088 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3088 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54498] VGAM3089 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3089 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3089 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3089 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54499] VGAM3255 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3255 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3255 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3255 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54500] VGAM3408 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3408 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3408 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3408 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54501] VGAM3444 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3444 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3444 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3444 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54502] It is appreciated that a function of VGR3902 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3902 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3902 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3902 gene: VGAM3088 host target protein, VGAM3089 host target protein, VGAM3255 host target protein, VGAM3408 host target protein and VGAM3444 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM3088, VGAM3089, VGAM3255, VGAM3408 and VGAM3444

[54503] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3903(VGR3903) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54504] VGR3903 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3903 gene was detected is described hereinabove with reference to Figs. 6–15.

[54505] VGR3903 gene encodes VGR3903 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54506] VGR3903 precursor RNA folds spatially, forming VGR3903 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3903 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3903 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54507] VGR3903 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1610 precursor RNA, VGAM1612 precursor RNA, VGAM1613 precursor RNA, VGAM1614 precursor RNA, VGAM1617 precursor RNA and VGAM1620 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54508] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1610 RNA, VGAM1612 RNA, VGAM1613 RNA, VGAM1614 RNA,

VGAM1617 RNA and VGAM1620 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54509] VGAM1610 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1610 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1610 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1610 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54510] VGAM1612 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1612 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1612 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1612 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54511] VGAM1613 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1613 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1613 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1613 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54512] VGAM1614 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1614 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1614 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1614 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54513] VGAM1617 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1617 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1617 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1617 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54514] VGAM1620 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1620 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1620 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1620 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54515] It is appreciated that a function of VGR3903 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3903 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3903 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3903 gene: VGAM1610 host target protein, VGAM1612 host target protein, VGAM1613 host target protein, VGAM1614 host target protein, VGAM1617 host target protein and VGAM1620 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1610, VGAM1612, VGAM1613, VGAM1614, VGAM1617 and VGAM1620

[54516] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3904(VGR3904) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54517] VGR3904 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3904 gene was detected is described hereinabove with reference to Figs. 6–15.

[54518] VGR3904 gene encodes VGR3904 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54519] VGR3904 precursor RNA folds spatially, forming VGR3904 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3904 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3904 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54520] VGR3904 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2282 precursor RNA and VGAM3724 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54521] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2282 RNA and VGAM3724 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM

RNA of Fig. 8.

[54522] VGAM2282 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2282 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2282 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2282 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54523] VGAM3724 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3724 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3724 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3724 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54524] It is appreciated that a function of VGR3904 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3904 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3904 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3904 gene: VGAM2282 host target protein and VGAM3724 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2282 and VGAM3724

[54525] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3905(VGR3905) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[54526] VGR3905 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3905 gene was detected is described hereinabove with reference to Figs. 6–15.

[54527] VGR3905 gene encodes VGR3905 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54528] VGR3905 precursor RNA folds spatially, forming VGR3905 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3905 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3905 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54529] VGR3905 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM401 precursor RNA, VGAM402 precursor RNA, VGAM403 precursor RNA, VGAM784 precursor RNA, VGAM789 precursor RNA, VGAM791 precursor RNA, VGAM832 precursor RNA and VGAM897 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54530] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM401 RNA, VGAM402 RNA, VGAM403 RNA, VGAM784 RNA, VGAM789 RNA, VGAM791 RNA, VGAM832 RNA and VGAM897 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54531] VGAM401 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM401 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM401 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM401 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54532] VGAM402 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM402 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM402 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM402 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54533] VGAM403 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM403 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM403 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM403 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54534] VGAM784 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM784 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM784 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM784 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[54535] VGAM789 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM789 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM789 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM789 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54536] VGAM791 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM791 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM791 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM791 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54537] VGAM832 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM832 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM832 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM832 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54538] VGAM897 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM897 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM897 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM897 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54539] It is appreciated that a function of VGR3905 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3905 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3905 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3905 gene: VGAM401 host target protein, VGAM402 host target protein, VGAM403 host target protein, VGAM784 host target protein, VGAM789 host target protein, VGAM791 host target protein, VGAM832 host target protein and VGAM897 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM401, VGAM402, VGAM403, VGAM784, VGAM789, VGAM791, VGAM832 and VGAM897

[54540] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3906(VGR3906) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54541] VGR3906 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3906 gene was detected is described hereinabove with reference to Figs. 6–15.

[54542] VGR3906 gene encodes VGR3906 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54543] VGR3906 precursor RNA folds spatially, forming VGR3906 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3906 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3906 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54544] VGR3906 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM898 precursor RNA, VGAM1045 precursor RNA, VGAM1048 precursor RNA, VGAM1049 precursor RNA, VGAM1050 precursor RNA, VGAM1051 precursor RNA, VGAM1091 precursor RNA and VGAM1093 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54545] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM898 RNA, VGAM1045 RNA, VGAM1048 RNA, VGAM1049 RNA, VGAM1050 RNA, VGAM1051 RNA, VGAM1091 RNA and

VGAM1093 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54546] VGAM898 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM898 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM898 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM898 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54547] VGAM1045 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1045 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1045 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1045 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54548] VGAM1048 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1048 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1048 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1048 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54549] VGAM1049 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1049 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1049 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1049 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54550] VGAM1050 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1050 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1050 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1050 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54551] VGAM1051 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1051 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1051 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1051 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54552] VGAM1091 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1091 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1091 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1091 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54553] VGAM1093 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1093 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1093 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1093 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54554] It is appreciated that a function of VGR3906 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3906 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3906 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3906 gene: VGAM898 host target protein, VGAM1045 host target protein, VGAM1048 host target protein, VGAM1049 host target protein, VGAM1050 host target protein, VGAM1051 host target protein, VGAM1091 host target protein and VGAM1093

host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM898, VGAM1045, VGAM1048, VGAM1049, VGAM1050, VGAM1051, VGAM1091 and VGAM1093

[54555] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3907(VGR3907) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54556] VGR3907 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3907 gene was detected is described hereinabove with reference to Figs. 6-15.

[54557] VGR3907 gene encodes VGR3907 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54558] VGR3907 precursor RNA folds spatially, forming VGR3907

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3907 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3907 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54559] VGR3907 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1095 precursor RNA, VGAM1100 precursor RNA, VGAM1112 precursor RNA, VGAM1333 precursor RNA, VGAM1352 precursor RNA, VGAM1450 precursor RNA, VGAM1606 precursor RNA and VGAM1618 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to

VGAM PRECURSOR RNA of Fig. 8.

[54560] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1095 RNA, VGAM1100 RNA, VGAM1112 RNA, VGAM1333 RNA, VGAM1352 RNA, VGAM1450 RNA, VGAM1606 RNA and VGAM1618 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54561] VGAM1095 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1095 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1095 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1095 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54562] VGAM1100 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1100 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1100 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1100 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54563] VGAM1112 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1112 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1112 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1112 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[54564] VGAM1333 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1333 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1333 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1333 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54565] VGAM1352 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1352 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1352 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1352 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54566] VGAM1450 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1450 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1450 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1450 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54567] VGAM1606 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1606 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1606 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM1606 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54568] VGAM1618 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1618 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1618 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1618 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54569] It is appreciated that a function of VGR3907 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3907 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3907 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3907 gene: VGAM1095 host target protein, VGAM1100 host target protein, VGAM1112 host target protein, VGAM1333 host target protein, VGAM1352 host target protein, VGAM1450 host target protein, VGAM1606 host target protein and VGAM1618 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1095, VGAM1100, VGAM1112, VGAM1333, VGAM1352, VGAM1450, VGAM1606 and VGAM1618

[54570] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3908(VGR3908) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54571] VGR3908 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3908 gene was detected is described hereinabove with reference to Figs. 6–15.

[54572] VGR3908 gene encodes VGR3908 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54573] VGR3908 precursor RNA folds spatially, forming VGR3908 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3908 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3908 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54574] VGR3908 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1631 precursor RNA, VGAM1635 precursor RNA, VGAM1636 precursor RNA, VGAM1656 precursor RNA, VGAM1805 precursor RNA, VGAM1833 pre–

cursor RNA, VGAM1869 precursor RNA and VGAM1872 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54575] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1631 RNA, VGAM1635 RNA, VGAM1636 RNA, VGAM1656 RNA, VGAM1805 RNA, VGAM1833 RNA, VGAM1869 RNA and VGAM1872 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54576] VGAM1631 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1631 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1631 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1631 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54577] VGAM1635 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1635 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1635 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1635 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54578] VGAM1636 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1636 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1636 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1636 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54579] VGAM1656 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1656 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1656 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1656 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54580] VGAM1805 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1805 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1805 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1805 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54581] VGAM1833 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1833 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1833 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1833 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54582] VGAM1869 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM1869 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1869 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1869 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54583] VGAM1872 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1872 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1872 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1872 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54584] It is appreciated that a function of VGR3908 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3908 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3908 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3908 gene: VGAM1631 host target protein, VGAM1635 host target protein, VGAM1636 host target protein, VGAM1656 host target protein, VGAM1805 host target protein, VGAM1833 host target protein, VGAM1869 host target protein and VGAM1872 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1631, VGAM1635, VGAM1636, VGAM1656, VGAM1805, VGAM1833, VGAM1869 and VGAM1872

[54585] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3909(VGR3909) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54586] VGR3909 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3909 gene was detected is described hereinabove with reference to Figs. 6–15.

[54587] VGR3909 gene encodes VGR3909 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54588] VGR3909 precursor RNA folds spatially, forming VGR3909 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3909 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3909 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[54589] VGR3909 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1949 precursor RNA, VGAM1979 precursor RNA, VGAM1983 precursor RNA, VGAM1985 precursor RNA, VGAM2046 precursor RNA, VGAM2049 precursor RNA, VGAM2135 precursor RNA and VGAM2146 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54590] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1949 RNA, VGAM1979 RNA, VGAM1983 RNA, VGAM1985 RNA, VGAM2046 RNA, VGAM2049 RNA, VGAM2135 RNA and VGAM2146 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54591] VGAM1949 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1949 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1949 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1949 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54592] VGAM1979 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1979 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1979 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1979 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54593] VGAM1983 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1983 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1983 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1983 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54594] VGAM1985 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1985 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1985 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1985 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54595] VGAM2046 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2046 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2046 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2046 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54596] VGAM2049 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2049 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2049 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2049 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54597] VGAM2135 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2135 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2135 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2135 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54598] VGAM2146 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2146 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2146 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2146 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54599] It is appreciated that a function of VGR3909 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3909 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3909 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3909 gene: VGAM1949 host target protein, VGAM1979 host target protein, VGAM1983 host target protein, VGAM1985 host target protein, VGAM2046 host target protein, VGAM2049 host target protein, VGAM2135 host target protein and VGAM2146 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1949, VGAM1979, VGAM1983, VGAM1985, VGAM2046, VGAM2049, VGAM2135 and VGAM2146

[54600] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3910(VGR3910) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54601] VGR3910 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3910 gene was detected is described hereinabove with reference to Figs. 6–15.

[54602] VGR3910 gene encodes VGR3910 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54603] VGR3910 precursor RNA folds spatially, forming VGR3910 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3910 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3910 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54604] VGR3910 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2150 precursor RNA, VGAM2192 precursor RNA, VGAM2259 precursor RNA, VGAM2260 precursor RNA, VGAM2305 precursor RNA, VGAM2343 precursor RNA, VGAM2383 precursor RNA and VGAM2384 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54605] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2150 RNA, VGAM2192 RNA, VGAM2259 RNA, VGAM2260 RNA, VGAM2305 RNA, VGAM2343 RNA, VGAM2383 RNA and VGAM2384 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54606] VGAM2150 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2150 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2150 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2150 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54607] VGAM2192 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2192 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2192 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2192 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54608] VGAM2259 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2259 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2259 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2259 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54609] VGAM2260 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2260 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2260 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2260 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54610] VGAM2305 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2305 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2305 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2305 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54611] VGAM2343 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2343 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2343 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2343 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54612] VGAM2383 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2383 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2383 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2383 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[54613] VGAM2384 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2384 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2384 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2384 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54614] It is appreciated that a function of VGR3910 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3910 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3910 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3910 gene: VGAM2150

host target protein, VGAM2192 host target protein, VGAM2259 host target protein, VGAM2260 host target protein, VGAM2305 host target protein, VGAM2343 host target protein, VGAM2383 host target protein and VGAM2384 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2150, VGAM2192, VGAM2259, VGAM2260, VGAM2305, VGAM2343, VGAM2383 and VGAM2384

[54615] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3911(VGR3911) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54616] VGR3911 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3911 gene was detected is described hereinabove with reference to Figs.

6-15.

[54617] VGR3911 gene encodes VGR3911 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54618] VGR3911 precursor RNA folds spatially, forming VGR3911 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3911 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3911 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54619] VGR3911 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2385 precursor RNA, VGAM2461 precursor RNA, VGAM2462 precursor RNA, VGAM2557 precursor RNA, VGAM2564 precursor RNA, VGAM2565 precursor RNA, VGAM2589 precursor RNA and VGAM2610 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54620] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2385 RNA, VGAM2461 RNA, VGAM2462 RNA, VGAM2557 RNA, VGAM2564 RNA, VGAM2565 RNA, VGAM2589 RNA and VGAM2610 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54621] VGAM2385 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2385 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2385 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2385 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54622] VGAM2461 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2461 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2461 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2461 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54623] VGAM2462 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2462 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2462 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2462 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54624] VGAM2557 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2557 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2557 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2557 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54625] VGAM2564 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2564 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2564 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2564 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54626] VGAM2565 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2565 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2565 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2565 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54627] VGAM2589 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2589 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2589 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2589 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54628] VGAM2610 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2610 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2610 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2610 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54629] It is appreciated that a function of VGR3911 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR3911 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3911 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3911 gene: VGAM2385 host target protein, VGAM2461 host target protein, VGAM2462 host target protein, VGAM2557 host target protein, VGAM2564 host target protein, VGAM2565 host target protein, VGAM2589 host target protein and VGAM2610 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2385, VGAM2461, VGAM2462, VGAM2557, VGAM2564, VGAM2565, VGAM2589 and VGAM2610

[54630] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3912(VGR3912) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54631] VGR3912 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3912 gene was detected is described hereinabove with reference to Figs. 6–15.

[54632] VGR3912 gene encodes VGR3912 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54633] VGR3912 precursor RNA folds spatially, forming VGR3912 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3912 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3912 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54634] VGR3912 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2699 precursor RNA, VGAM2709 precursor RNA, VGAM2710 precursor RNA, VGAM2740 precursor RNA, VGAM2741 precursor RNA, VGAM2769 precursor RNA, VGAM2798 precursor RNA and VGAM2839 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54635] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2699 RNA, VGAM2709 RNA, VGAM2710 RNA, VGAM2740 RNA, VGAM2741 RNA, VGAM2769 RNA, VGAM2798 RNA and VGAM2839 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54636] VGAM2699 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2699 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2699 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2699 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54637] VGAM2709 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2709 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2709 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2709 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[54638] VGAM2710 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2710 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2710 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2710 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54639] VGAM2740 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2740 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2740 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2740 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54640] VGAM2741 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2741 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2741 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2741 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54641] VGAM2769 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2769 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2769 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2769 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54642] VGAM2798 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2798 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2798 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2798 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54643] VGAM2839 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2839 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2839 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM2839 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54644] It is appreciated that a function of VGR3912 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3912 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3912 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3912 gene: VGAM2699 host target protein, VGAM2709 host target protein, VGAM2710 host target protein, VGAM2740 host target protein, VGAM2741 host target protein, VGAM2769 host target protein, VGAM2798 host target protein and VGAM2839 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2699, VGAM2709, VGAM2710,

VGAM2740, VGAM2741, VGAM2769, VGAM2798 and VGAM2839

[54645] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3913(VGR3913) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54646] VGR3913 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3913 gene was detected is described hereinabove with reference to Figs. 6–15.

[54647] VGR3913 gene encodes VGR3913 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54648] VGR3913 precursor RNA folds spatially, forming VGR3913 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3913 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3913 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54649] VGR3913 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2840 precursor RNA, VGAM2913 precursor RNA, VGAM2914 precursor RNA, VGAM2976 precursor RNA, VGAM3009 precursor RNA, VGAM3033 precursor RNA, VGAM3037 precursor RNA and VGAM3064 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54650] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2840

RNA, VGAM2913 RNA, VGAM2914 RNA, VGAM2976 RNA, VGAM3009 RNA, VGAM3033 RNA, VGAM3037 RNA and VGAM3064 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54651] VGAM2840 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2840 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2840 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2840 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54652] VGAM2913 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2913 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2913 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2913 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54653] VGAM2914 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2914 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2914 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2914 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54654] VGAM2976 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2976 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2976 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2976 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54655] VGAM3009 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3009 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3009 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3009 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54656] VGAM3033 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM3033 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3033 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3033 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54657] VGAM3037 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3037 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3037 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3037 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54658] VGAM3064 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3064 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3064 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3064 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54659] It is appreciated that a function of VGR3913 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3913 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3913 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3913 gene: VGAM2840 host target protein, VGAM2913 host target protein, VGAM2914 host target protein, VGAM2976 host target

protein, VGAM3009 host target protein, VGAM3033 host target protein, VGAM3037 host target protein and VGAM3064 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2840, VGAM2913, VGAM2914, VGAM2976, VGAM3009, VGAM3033, VGAM3037 and VGAM3064

[54660] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3914(VGR3914) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54661] VGR3914 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3914 gene was detected is described hereinabove with reference to Figs. 6-15.

[54662] VGR3914 gene encodes VGR3914 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54663] VGR3914 precursor RNA folds spatially, forming VGR3914 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3914 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3914 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54664] VGR3914 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3072 precursor RNA, VGAM3073 precursor RNA, VGAM3108 precursor RNA, VGAM3148 precursor RNA, VGAM3243 precursor RNA, VGAM3274 precursor RNA, VGAM3285 precursor RNA and VGAM3287 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54665] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3072 RNA, VGAM3073 RNA, VGAM3108 RNA, VGAM3148 RNA, VGAM3243 RNA, VGAM3274 RNA, VGAM3285 RNA and VGAM3287 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54666] VGAM3072 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3072 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3072 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM3072 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54667] VGAM3073 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3073 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3073 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3073 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54668] VGAM3108 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3108 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3108 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM3108 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54669] VGAM3148 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3148 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3148 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3148 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54670] VGAM3243 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3243 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3243 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3243 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54671] VGAM3274 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3274 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3274 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3274 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54672] VGAM3285 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3285 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3285 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3285 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54673] VGAM3287 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3287 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3287 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3287 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54674] It is appreciated that a function of VGR3914 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3914 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3914 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3914 gene: VGAM3072 host target protein, VGAM3073 host target protein, VGAM3108 host target protein, VGAM3148 host target protein, VGAM3243 host target protein, VGAM3274 host target protein, VGAM3285 host target protein and VGAM3287 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3072, VGAM3073, VGAM3108, VGAM3148, VGAM3243, VGAM3274, VGAM3285 and VGAM3287

[54675] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3915(VGR3915) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[54676] VGR3915 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3915 gene was detected is described hereinabove with reference to Figs. 6–15.

[54677] VGR3915 gene encodes VGR3915 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54678] VGR3915 precursor RNA folds spatially, forming VGR3915 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3915 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3915 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54679] VGR3915 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM3288 precursor RNA, VGAM3397 precursor RNA, VGAM3499 precursor RNA, VGAM3584 precursor RNA, VGAM3588 precursor RNA, VGAM3596 precursor RNA, VGAM3631 precursor RNA and VGAM3633 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54680] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3288 RNA, VGAM3397 RNA, VGAM3499 RNA, VGAM3584 RNA, VGAM3588 RNA, VGAM3596 RNA, VGAM3631 RNA and VGAM3633 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54681] VGAM3288 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM3288 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3288 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3288 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54682] VGAM3397 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3397 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3397 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3397 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54683] VGAM3499 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3499 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3499 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3499 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54684] VGAM3584 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3584 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3584 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3584 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54685] VGAM3588 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3588 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3588 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3588 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54686] VGAM3596 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3596 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3596 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3596 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[54687] VGAM3631 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3631 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3631 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3631 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54688] VGAM3633 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3633 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3633 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3633 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54689] It is appreciated that a function of VGR3915 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3915 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3915 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3915 gene: VGAM3288 host target protein, VGAM3397 host target protein, VGAM3499 host target protein, VGAM3584 host target protein, VGAM3588 host target protein, VGAM3596 host target protein, VGAM3631 host target protein and VGAM3633 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3288, VGAM3397, VGAM3499, VGAM3584, VGAM3588, VGAM3596, VGAM3631 and VGAM3633

[54690] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3916(VGR3916) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54691] VGR3916 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3916 gene was detected is described hereinabove with reference to Figs. 6–15.

[54692] VGR3916 gene encodes VGR3916 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54693] VGR3916 precursor RNA folds spatially, forming VGR3916 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3916 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3916 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54694] VGR3916 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3680 precursor RNA and VGAM3700 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54695] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3680 RNA and VGAM3700 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54696] VGAM3680 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3680 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3680 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3680 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54697] VGAM3700 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3700 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3700 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3700 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54698] It is appreciated that a function of VGR3916 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3916 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3916 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3916 gene: VGAM3680 host target protein and VGAM3700 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3680 and VGAM3700

[54699] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3917(VGR3917) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54700] VGR3917 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3917 gene was detected is described hereinabove with reference to Figs. 6–15.

[54701] VGR3917 gene encodes VGR3917 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54702] VGR3917 precursor RNA folds spatially, forming VGR3917 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3917 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3917 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54703] VGR3917 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM460 precursor RNA, VGAM464 precursor RNA, VGAM748 precursor RNA, VGAM749 precursor RNA, VGAM752 precursor RNA, VGAM1964 precursor

RNA, VGAM2739 precursor RNA and VGAM2802 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54704] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM460 RNA, VGAM464 RNA, VGAM748 RNA, VGAM749 RNA, VGAM752 RNA, VGAM1964 RNA, VGAM2739 RNA and VGAM2802 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54705] VGAM460 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM460 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM460 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM460 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54706] VGAM464 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM464 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM464 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM464 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54707] VGAM748 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM748 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM748 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM748 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54708] VGAM749 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM749 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM749 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM749 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54709] VGAM752 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM752 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM752 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM752 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54710] VGAM1964 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1964 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1964 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1964 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54711] VGAM2739 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM2739 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2739 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2739 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54712] VGAM2802 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2802 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2802 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2802 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54713] It is appreciated that a function of VGR3917 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3917 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3917 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3917 gene: VGAM460 host target protein, VGAM464 host target protein, VGAM748 host target protein, VGAM749 host target protein, VGAM752 host target protein, VGAM1964 host target protein, VGAM2739 host target protein and VGAM2802 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM460, VGAM464, VGAM748, VGAM749, VGAM752, VGAM1964, VGAM2739 and VGAM2802

[54714] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3918(VGR3918) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54715] VGR3918 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3918 gene was detected is described hereinabove with reference to Figs. 6–15.

[54716] VGR3918 gene encodes VGR3918 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54717] VGR3918 precursor RNA folds spatially, forming VGR3918 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3918 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3918 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54718] VGR3918 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2803 precursor RNA, VGAM2804 precursor RNA, VGAM2965 precursor RNA, VGAM2982 precursor RNA and VGAM2983 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54719] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2803 RNA, VGAM2804 RNA, VGAM2965 RNA, VGAM2982 RNA and VGAM2983 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54720] VGAM2803 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2803 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2803 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2803 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54721] VGAM2804 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2804 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2804 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2804 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54722] VGAM2965 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2965 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2965 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2965 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54723] VGAM2982 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2982 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2982 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2982 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54724] VGAM2983 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM2983 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2983 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2983 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54725] It is appreciated that a function of VGR3918 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3918 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3918 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3918 gene: VGAM2803 host target protein, VGAM2804 host target protein, VGAM2965 host target protein, VGAM2982 host target protein and VGAM2983 host target protein, herein

schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2803, VGAM2804, VGAM2965, VGAM2982 and VGAM2983

[54726] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3919(VGR3919) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54727] VGR3919 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3919 gene was detected is described hereinabove with reference to Figs. 6-15.

[54728] VGR3919 gene encodes VGR3919 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54729] VGR3919 precursor RNA folds spatially, forming VGR3919 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR3919 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3919 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54730] VGR3919 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM528 precursor RNA, VGAM529 precursor RNA and VGAM3328 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54731] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM528 RNA, VGAM529 RNA and VGAM3328 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2

RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54732] VGAM528 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM528 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM528 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM528 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54733] VGAM529 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM529 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM529 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM529 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54734] VGAM3328 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3328 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3328 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3328 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54735] It is appreciated that a function of VGR3919 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3919 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3919 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3919 gene: VGAM528 host target protein, VGAM529 host target protein and VGAM3328 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM528, VGAM529 and VGAM3328

[54736] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3920(VGR3920) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54737] VGR3920 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3920 gene was detected is described hereinabove with reference to Figs. 6–15.

[54738] VGR3920 gene encodes VGR3920 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[54739] VGR3920 precursor RNA folds spatially, forming VGR3920 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3920 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3920 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54740] VGR3920 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1397 precursor RNA, VGAM1398 precursor RNA, VGAM1399 precursor RNA and VGAM3137 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54741] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1397 RNA, VGAM1398 RNA, VGAM1399 RNA and VGAM3137 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54742] VGAM1397 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1397 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1397 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1397 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54743] VGAM1398 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1398 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1398 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1398 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54744] VGAM1399 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1399 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1399 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1399 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54745] VGAM3137 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM3137 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3137 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3137 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54746] It is appreciated that a function of VGR3920 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3920 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3920 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3920 gene: VGAM1397 host target protein, VGAM1398 host target protein, VGAM1399 host target protein and VGAM3137 host target protein, herein schematically represented by VGAM1 HOST

TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1397, VGAM1398, VGAM1399 and VGAM3137

[54747] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3921(VGR3921) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54748] VGR3921 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3921 gene was detected is described hereinabove with reference to Figs. 6–15.

[54749] VGR3921 gene encodes VGR3921 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54750] VGR3921 precursor RNA folds spatially, forming VGR3921 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3921 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3921 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54751] VGR3921 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1400 precursor RNA and VGAM1404 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54752] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1400 RNA and VGAM1404 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM

RNA of Fig. 8.

[54753] VGAM1400 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1400 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1400 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1400 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54754] VGAM1404 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1404 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1404 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1404 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54755] It is appreciated that a function of VGR3921 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3921 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3921 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3921 gene: VGAM1400 host target protein and VGAM1404 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1400 and VGAM1404

[54756] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3922(VGR3922) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[54757] VGR3922 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3922 gene was detected is described hereinabove with reference to Figs. 6–15.

[54758] VGR3922 gene encodes VGR3922 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54759] VGR3922 precursor RNA folds spatially, forming VGR3922 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3922 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3922 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54760] VGR3922 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1394 precursor RNA, VGAM1395 precursor RNA and VGAM1396 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54761] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1394 RNA, VGAM1395 RNA and VGAM1396 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54762] VGAM1394 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1394 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1394 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM1394 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54763] VGAM1395 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1395 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1395 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1395 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54764] VGAM1396 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1396 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1396 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1396 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54765] It is appreciated that a function of VGR3922 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3922 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3922 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3922 gene: VGAM1394 host target protein, VGAM1395 host target protein and VGAM1396 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1394, VGAM1395 and VGAM1396

[54766] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3923(VGR3923) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54767] VGR3923 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3923 gene was detected is described hereinabove with reference to Figs. 6-15.

[54768] VGR3923 gene encodes VGR3923 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54769] VGR3923 precursor RNA folds spatially, forming VGR3923 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3923 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3923 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54770] VGR3923 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3020 precursor RNA and VGAM3192 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54771] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3020 RNA and VGAM3192 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54772] VGAM3020 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3020 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3020 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3020 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54773] VGAM3192 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3192 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3192 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3192 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54774] It is appreciated that a function of VGR3923 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3923 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3923 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3923 gene: VGAM3020 host target protein and VGAM3192 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3020 and VGAM3192

[54775] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3924(VGR3924) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54776] VGR3924 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3924 gene was detected is described hereinabove with reference to Figs.

6-15.

[54777] VGR3924 gene encodes VGR3924 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54778] VGR3924 precursor RNA folds spatially, forming VGR3924 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3924 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3924 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54779] VGR3924 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM810 precursor RNA, VGAM812 precursor RNA, VGAM815 precursor RNA, VGAM816 precursor RNA, VGAM817 precursor RNA, VGAM894 precursor RNA, VGAM895 precursor RNA and VGAM896 precursor RNA, herein schematically represented by VGAM1 PRECURSOR,

VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54780] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM810 RNA, VGAM812 RNA, VGAM815 RNA, VGAM816 RNA, VGAM817 RNA, VGAM894 RNA, VGAM895 RNA and VGAM896 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54781] VGAM810 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM810 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM810 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM810 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54782] VGAM812 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM812 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM812 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM812 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54783] VGAM815 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM815 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM815 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM815 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54784] VGAM816 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM816 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM816 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM816 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54785] VGAM817 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM817 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM817 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM817 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54786] VGAM894 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM894 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM894 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM894 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54787] VGAM895 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM895 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM895 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM895 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54788] VGAM896 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM896 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM896 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM896 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54789] It is appreciated that a function of VGR3924 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR3924 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3924 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3924 gene: VGAM810 host target protein, VGAM812 host target protein, VGAM815 host target protein, VGAM816 host target protein, VGAM817 host target protein, VGAM894 host target protein, VGAM895 host target protein and VGAM896 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM810, VGAM812, VGAM815, VGAM816, VGAM817, VGAM894, VGAM895 and VGAM896

[54790] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3925(VGR3925) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[54791] VGR3925 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3925 gene was detected is described hereinabove with reference to Figs. 6–15.

[54792] VGR3925 gene encodes VGR3925 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54793] VGR3925 precursor RNA folds spatially, forming VGR3925 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3925 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3925 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54794] VGR3925 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1039 precursor RNA, VGAM1226 precursor RNA, VGAM1229 precursor RNA, VGAM1313 precursor RNA, VGAM1809 precursor RNA, VGAM1811 precursor RNA, VGAM1814 precursor RNA and VGAM1815 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54795] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1039 RNA, VGAM1226 RNA, VGAM1229 RNA, VGAM1313 RNA, VGAM1809 RNA, VGAM1811 RNA, VGAM1814 RNA and VGAM1815 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54796] VGAM1039 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1039 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1039 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1039 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54797] VGAM1226 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1226 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1226 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1226 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54798] VGAM1229 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1229 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1229 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1229 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54799] VGAM1313 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1313 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1313 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1313 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[54800] VGAM1809 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1809 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1809 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1809 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54801] VGAM1811 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1811 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1811 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1811 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54802] VGAM1814 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1814 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1814 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1814 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54803] VGAM1815 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1815 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1815 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM1815 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54804] It is appreciated that a function of VGR3925 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3925 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3925 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3925 gene: VGAM1039 host target protein, VGAM1226 host target protein, VGAM1229 host target protein, VGAM1313 host target protein, VGAM1809 host target protein, VGAM1811 host target protein, VGAM1814 host target protein and VGAM1815 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1039, VGAM1226, VGAM1229, VGAM1313, VGAM1809, VGAM1811, VGAM1814 and

VGAM1815

[54805] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3926(VGR3926) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54806] VGR3926 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3926 gene was detected is described hereinabove with reference to Figs. 6–15.

[54807] VGR3926 gene encodes VGR3926 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54808] VGR3926 precursor RNA folds spatially, forming VGR3926 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3926 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR3926 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54809] VGR3926 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2207 precursor RNA, VGAM2208 precursor RNA, VGAM2780 precursor RNA, VGAM3068 precursor RNA, VGAM3130 precursor RNA, VGAM3131 precursor RNA, VGAM3245 precursor RNA and VGAM3289 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54810] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2207 RNA, VGAM2208 RNA, VGAM2780 RNA, VGAM3068 RNA,

VGAM3130 RNA, VGAM3131 RNA, VGAM3245 RNA and VGAM3289 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54811] VGAM2207 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2207 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2207 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2207 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54812] VGAM2208 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2208 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2208 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2208 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54813] VGAM2780 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2780 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2780 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2780 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54814] VGAM3068 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3068 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3068 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3068 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54815] VGAM3130 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3130 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3130 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3130 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54816] VGAM3131 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3131 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3131 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3131 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54817] VGAM3245 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3245 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3245 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3245 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54818] VGAM3289 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM3289 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3289 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3289 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54819] It is appreciated that a function of VGR3926 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3926 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3926 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3926 gene: VGAM2207 host target protein, VGAM2208 host target protein, VGAM2780 host target protein, VGAM3068 host target protein, VGAM3130 host target protein, VGAM3131 host

target protein, VGAM3245 host target protein and VGAM3289 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2207, VGAM2208, VGAM2780, VGAM3068, VGAM3130, VGAM3131, VGAM3245 and VGAM3289

[54820] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3927(VGR3927) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54821] VGR3927 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3927 gene was detected is described hereinabove with reference to Figs. 6–15.

[54822] VGR3927 gene encodes VGR3927 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[54823] VGR3927 precursor RNA folds spatially, forming VGR3927 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3927 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3927 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54824] VGR3927 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM3450 precursor RNA, VGAM3465 precursor RNA, VGAM3561 precursor RNA, VGAM3569 precursor RNA, VGAM3573 precursor RNA, VGAM3630 precursor RNA and VGAM3771 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54825] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3450 RNA, VGAM3465 RNA, VGAM3561 RNA, VGAM3569 RNA, VGAM3573 RNA, VGAM3630 RNA and VGAM3771 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54826] VGAM3450 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3450 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3450 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3450 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54827] VGAM3465 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3465 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3465 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3465 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54828] VGAM3561 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3561 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3561 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3561 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[54829] VGAM3569 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3569 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3569 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3569 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54830] VGAM3573 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3573 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3573 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3573 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54831] VGAM3630 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3630 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3630 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3630 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54832] VGAM3771 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3771 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3771 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM3771 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54833] It is appreciated that a function of VGR3927 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3927 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3927 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3927 gene: VGAM3450 host target protein, VGAM3465 host target protein, VGAM3561 host target protein, VGAM3569 host target protein, VGAM3573 host target protein, VGAM3630 host target protein and VGAM3771 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3450, VGAM3465, VGAM3561, VGAM3569, VGAM3573, VGAM3630 and VGAM3771

[54834] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3928(VGR3928) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54835] VGR3928 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3928 gene was detected is described hereinabove with reference to Figs. 6–15.

[54836] VGR3928 gene encodes VGR3928 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54837] VGR3928 precursor RNA folds spatially, forming VGR3928 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3928 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3928 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54838] VGR3928 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM833 precursor RNA, VGAM835 precursor RNA, VGAM836 precursor RNA, VGAM838 precursor RNA, VGAM839 precursor RNA, VGAM840 precursor RNA and VGAM841 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54839] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM833 RNA, VGAM835 RNA, VGAM836 RNA, VGAM838 RNA, VGAM839 RNA, VGAM840 RNA and VGAM841 RNA respectively, herein schematically represented by VGAM1

RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54840] VGAM833 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM833 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM833 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM833 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54841] VGAM835 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM835 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM835 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM835 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54842] VGAM836 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM836 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM836 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM836 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54843] VGAM838 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM838 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM838 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM838 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54844] VGAM839 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM839 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM839 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM839 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54845] VGAM840 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM840 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM840 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM840 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54846] VGAM841 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM841 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM841 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM841 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54847] It is appreciated that a function of VGR3928 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3928 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3928 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3928 gene: VGAM833 host target protein, VGAM835 host target protein, VGAM836 host target protein, VGAM838 host target protein, VGAM839 host target protein, VGAM840 host target protein and VGAM841 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated herein-above with reference to VGAM833, VGAM835, VGAM836, VGAM838, VGAM839, VGAM840 and VGAM841

[54848] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3929(VGR3929) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54849] VGR3929 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3929 gene was detected is described hereinabove with reference to Figs. 6–15.

[54850] VGR3929 gene encodes VGR3929 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54851] VGR3929 precursor RNA folds spatially, forming VGR3929 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3929 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3929 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54852] VGR3929 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1451 precursor RNA, VGAM1452 precursor RNA, VGAM1454 precursor RNA, VGAM1457 pre–

cursor RNA, VGAM1458 precursor RNA, VGAM1460 precursor RNA, VGAM1462 precursor RNA and VGAM1464 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54853] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1451 RNA, VGAM1452 RNA, VGAM1454 RNA, VGAM1457 RNA, VGAM1458 RNA, VGAM1460 RNA, VGAM1462 RNA and VGAM1464 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54854] VGAM1451 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1451 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1451 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1451 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54855] VGAM1452 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1452 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1452 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1452 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54856] VGAM1454 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1454 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1454 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1454 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54857] VGAM1457 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1457 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1457 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1457 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54858] VGAM1458 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM1458 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1458 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1458 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54859] VGAM1460 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1460 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1460 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1460 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54860] VGAM1462 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1462 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1462 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1462 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54861] VGAM1464 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1464 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1464 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1464 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54862] It is appreciated that a function of VGR3929 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3929 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3929 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3929 gene: VGAM1451 host target protein, VGAM1452 host target protein, VGAM1454 host target protein, VGAM1457 host target protein, VGAM1458 host target protein, VGAM1460 host target protein, VGAM1462 host target protein and VGAM1464 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1451, VGAM1452, VGAM1454, VGAM1457, VGAM1458, VGAM1460, VGAM1462 and VGAM1464

[54863] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3930(VGR3930) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54864] VGR3930 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3930 gene was detected is described hereinabove with reference to Figs. 6-15.

[54865] VGR3930 gene encodes VGR3930 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54866] VGR3930 precursor RNA folds spatially, forming VGR3930 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3930 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3930 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54867] VGR3930 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2013 precursor RNA, VGAM2014 precursor RNA, VGAM2015 precursor RNA, VGAM2016 precursor RNA and VGAM2017 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54868] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2013 RNA, VGAM2014 RNA, VGAM2015 RNA, VGAM2016 RNA and VGAM2017 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54869] VGAM2013 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2013 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2013 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2013 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54870] VGAM2014 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2014 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2014 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2014 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54871] VGAM2015 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2015 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2015 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2015 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54872] VGAM2016 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2016 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2016 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2016 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54873] VGAM2017 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2017 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2017 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2017 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54874] It is appreciated that a function of VGR3930 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3930 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3930 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3930 gene: VGAM2013 host target protein, VGAM2014 host target protein,

VGAM2015 host target protein, VGAM2016 host target protein and VGAM2017 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2013, VGAM2014, VGAM2015, VGAM2016 and VGAM2017

[54875] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3931(VGR3931) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54876] VGR3931 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3931 gene was detected is described hereinabove with reference to Figs. 6-15.

[54877] VGR3931 gene encodes VGR3931 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54878] VGR3931 precursor RNA folds spatially, forming VGR3931 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3931 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3931 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54879] VGR3931 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM807 precursor RNA, VGAM808 precursor RNA, VGAM809 precursor RNA and VGAM3705 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54880] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM807 RNA, VGAM808 RNA, VGAM809 RNA and VGAM3705 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54881] VGAM807 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM807 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM807 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM807 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54882] VGAM808 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM808 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM808 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM808 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54883] VGAM809 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM809 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM809 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM809 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54884] VGAM3705 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3705 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3705 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3705 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54885] It is appreciated that a function of VGR3931 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3931 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3931 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3931 gene: VGAM807 host target protein, VGAM808 host target protein, VGAM809 host target protein and VGAM3705 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elabo-

rated hereinabove with reference to VGAM807, VGAM808, VGAM809 and VGAM3705

[54886] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3932(VGR3932) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54887] VGR3932 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3932 gene was detected is described hereinabove with reference to Figs. 6-15.

[54888] VGR3932 gene encodes VGR3932 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54889] VGR3932 precursor RNA folds spatially, forming VGR3932 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3932 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3932 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54890] VGR3932 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM224 precursor RNA, VGAM229 precursor RNA, VGAM236 precursor RNA, VGAM237 precursor RNA, VGAM239 precursor RNA, VGAM240 precursor RNA, VGAM241 precursor RNA and VGAM244 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54891] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM224

RNA, VGAM229 RNA, VGAM236 RNA, VGAM237 RNA, VGAM239 RNA, VGAM240 RNA, VGAM241 RNA and VGAM244 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54892] VGAM224 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM224 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM224 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM224 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54893] VGAM229 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM229 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM229 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM229 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54894] VGAM236 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM236 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM236 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM236 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54895] VGAM237 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM237 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM237 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM237 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54896] VGAM239 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM239 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM239 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM239 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54897] VGAM240 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM240 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM240 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM240 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54898] VGAM241 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM241 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM241 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM241 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54899] VGAM244 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM244 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM244 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM244 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54900] It is appreciated that a function of VGR3932 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3932 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3932 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3932 gene: VGAM224 host target protein, VGAM229 host target protein, VGAM236 host target protein, VGAM237 host target protein,

VGAM239 host target protein, VGAM240 host target protein, VGAM241 host target protein and VGAM244 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM224, VGAM229, VGAM236, VGAM237, VGAM239, VGAM240, VGAM241 and VGAM244

[54901] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3933(VGR3933) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54902] VGR3933 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3933 gene was detected is described hereinabove with reference to Figs. 6-15.

[54903] VGR3933 gene encodes VGR3933 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[54904] VGR3933 precursor RNA folds spatially, forming VGR3933 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3933 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3933 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54905] VGR3933 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM247 precursor RNA, VGAM250 precursor RNA, VGAM251 precursor RNA, VGAM330 precursor RNA, VGAM331 precursor RNA, VGAM389 precursor RNA, VGAM536 precursor RNA and VGAM537 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively,

each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54906] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM247 RNA, VGAM250 RNA, VGAM251 RNA, VGAM330 RNA, VGAM331 RNA, VGAM389 RNA, VGAM536 RNA and VGAM537 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54907] VGAM247 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM247 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM247 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM247 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54908] VGAM250 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM250 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM250 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM250 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54909] VGAM251 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM251 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM251 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM251 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54910] VGAM330 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM330 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM330 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM330 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54911] VGAM331 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM331 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM331 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM331 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54912] VGAM389 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM389 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM389 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM389 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54913] VGAM536 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM536 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM536 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM536 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54914] VGAM537 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM537 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM537 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM537 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54915] It is appreciated that a function of VGR3933 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3933 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3933

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3933 gene: VGAM247 host target protein, VGAM250 host target protein, VGAM251 host target protein, VGAM330 host target protein, VGAM331 host target protein, VGAM389 host target protein, VGAM536 host target protein and VGAM537 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM247, VGAM250, VGAM251, VGAM330, VGAM331, VGAM389, VGAM536 and VGAM537

[54916] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3934(VGR3934) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54917] VGR3934 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3934 gene was detected is described hereinabove with reference to Figs. 6–15.

[54918] VGR3934 gene encodes VGR3934 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54919] VGR3934 precursor RNA folds spatially, forming VGR3934 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3934 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3934 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54920] VGR3934 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM552 precursor RNA, VGAM553 precursor RNA, VGAM637 precursor RNA, VGAM640 precursor

RNA, VGAM641 precursor RNA, VGAM714 precursor RNA, VGAM715 precursor RNA and VGAM747 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54921] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM552 RNA, VGAM553 RNA, VGAM637 RNA, VGAM640 RNA, VGAM641 RNA, VGAM714 RNA, VGAM715 RNA and VGAM747 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54922] VGAM552 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM552 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM552 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM552 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54923] VGAM553 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM553 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM553 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM553 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54924] VGAM637 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM637 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM637 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM637 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54925] VGAM640 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM640 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM640 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM640 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54926] VGAM641 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM641 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM641 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM641 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54927] VGAM714 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM714 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM714 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM714 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54928] VGAM715 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM715 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM715 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM715 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54929] VGAM747 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM747 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM747 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM747 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54930] It is appreciated that a function of VGR3934 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3934 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3934 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3934 gene: VGAM552 host target protein, VGAM553 host target protein, VGAM637 host target protein, VGAM640 host target protein, VGAM641 host target protein, VGAM714 host target protein, VGAM715 host target protein and VGAM747 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM552, VGAM553, VGAM637, VGAM640, VGAM641, VGAM714, VGAM715 and VGAM747

[54931] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3935(VGR3935) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54932] VGR3935 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3935 gene was detected is described hereinabove with reference to Figs. 6–15.

[54933] VGR3935 gene encodes VGR3935 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54934] VGR3935 precursor RNA folds spatially, forming VGR3935 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3935 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3935 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[54935] VGR3935 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM750 precursor RNA, VGAM751 precursor RNA, VGAM754 precursor RNA, VGAM756 precursor RNA, VGAM917 precursor RNA, VGAM918 precursor RNA, VGAM919 precursor RNA and VGAM920 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54936] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM750 RNA, VGAM751 RNA, VGAM754 RNA, VGAM756 RNA, VGAM917 RNA, VGAM918 RNA, VGAM919 RNA and VGAM920 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54937] VGAM750 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM750 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM750 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM750 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54938] VGAM751 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM751 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM751 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM751 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54939] VGAM754 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM754 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM754 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM754 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54940] VGAM756 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM756 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM756 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM756 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54941] VGAM917 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM917 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM917 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM917 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54942] VGAM918 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM918 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM918 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM918 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54943] VGAM919 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM919 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM919 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM919 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54944] VGAM920 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM920 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM920 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM920 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54945] It is appreciated that a function of VGR3935 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3935 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3935 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3935 gene: VGAM750 host target protein, VGAM751 host target protein, VGAM754 host target protein, VGAM756 host target protein, VGAM917 host target protein, VGAM918 host target protein, VGAM919 host target protein and VGAM920 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host tar-

get genes is elaborated hereinabove with reference to VGAM750, VGAM751, VGAM754, VGAM756, VGAM917, VGAM918, VGAM919 and VGAM920

[54946] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3936(VGR3936) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54947] VGR3936 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3936 gene was detected is described hereinabove with reference to Figs. 6–15.

[54948] VGR3936 gene encodes VGR3936 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54949] VGR3936 precursor RNA folds spatially, forming VGR3936 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3936 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3936 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54950] VGR3936 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM921 precursor RNA, VGAM1291 precursor RNA, VGAM1292 precursor RNA, VGAM1697 precursor RNA, VGAM1698 precursor RNA, VGAM1699 precursor RNA, VGAM1702 precursor RNA and VGAM2039 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54951] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM921 RNA, VGAM1291 RNA, VGAM1292 RNA, VGAM1697 RNA, VGAM1698 RNA, VGAM1699 RNA, VGAM1702 RNA and VGAM2039 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54952] VGAM921 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM921 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM921 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM921 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54953] VGAM1291 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1291 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1291 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1291 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54954] VGAM1292 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1292 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1292 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1292 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54955] VGAM1697 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM1697 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1697 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1697 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54956] VGAM1698 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1698 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1698 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1698 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54957] VGAM1699 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1699 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1699 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1699 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54958] VGAM1702 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1702 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1702 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1702 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54959] VGAM2039 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2039 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2039 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2039 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54960] It is appreciated that a function of VGR3936 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3936 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3936 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3936 gene: VGAM921 host target protein, VGAM1291 host target protein, VGAM1292

host target protein, VGAM1697 host target protein, VGAM1698 host target protein, VGAM1699 host target protein, VGAM1702 host target protein and VGAM2039 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM921, VGAM1291, VGAM1292, VGAM1697, VGAM1698, VGAM1699, VGAM1702 and VGAM2039

[54961] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3937(VGR3937) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54962] VGR3937 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3937 gene was detected is described hereinabove with reference to Figs. 6-15.

[54963] VGR3937 gene encodes VGR3937 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54964] VGR3937 precursor RNA folds spatially, forming VGR3937 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3937 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3937 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54965] VGR3937 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2356 precursor RNA, VGAM2357 precursor RNA, VGAM2372 precursor RNA, VGAM2412 precursor RNA, VGAM2428 precursor RNA, VGAM2486 precursor RNA, VGAM2487 precursor RNA and VGAM2601 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54966] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2356 RNA, VGAM2357 RNA, VGAM2372 RNA, VGAM2412 RNA, VGAM2428 RNA, VGAM2486 RNA, VGAM2487 RNA and VGAM2601 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54967] VGAM2356 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2356 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2356 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM2356 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54968] VGAM2357 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2357 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2357 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2357 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54969] VGAM2372 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2372 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2372 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM2372 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54970] VGAM2412 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2412 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2412 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2412 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54971] VGAM2428 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2428 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2428 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2428 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54972] VGAM2486 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2486 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2486 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2486 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[54973] VGAM2487 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2487 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2487 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2487 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54974] VGAM2601 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2601 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2601 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2601 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54975] It is appreciated that a function of VGR3937 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3937 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3937 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3937 gene: VGAM2356 host target protein, VGAM2357 host target protein, VGAM2372 host target protein, VGAM2412 host target protein, VGAM2428 host target protein, VGAM2486 host target protein, VGAM2487 host target protein and VGAM2601 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2356, VGAM2357, VGAM2372, VGAM2412, VGAM2428, VGAM2486, VGAM2487 and VGAM2601

[54976] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3938(VGR3938) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[54977] VGR3938 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3938 gene was detected is described hereinabove with reference to Figs. 6–15.

[54978] VGR3938 gene encodes VGR3938 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54979] VGR3938 precursor RNA folds spatially, forming VGR3938 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3938 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3938 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[54980] VGR3938 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM2602 precursor RNA, VGAM2753 precursor RNA, VGAM2856 precursor RNA, VGAM2943 precursor RNA, VGAM2944 precursor RNA, VGAM2969 precursor RNA, VGAM3010 precursor RNA and VGAM3066 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54981] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2602 RNA, VGAM2753 RNA, VGAM2856 RNA, VGAM2943 RNA, VGAM2944 RNA, VGAM2969 RNA, VGAM3010 RNA and VGAM3066 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54982] VGAM2602 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2602 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2602 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2602 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54983] VGAM2753 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2753 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2753 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2753 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54984] VGAM2856 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2856 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2856 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2856 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[54985] VGAM2943 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2943 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2943 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2943 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[54986] VGAM2944 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2944 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2944 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2944 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[54987] VGAM2969 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2969 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2969 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2969 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[54988] VGAM3010 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3010 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3010 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3010 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[54989] VGAM3066 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3066 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3066 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3066 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[54990] It is appreciated that a function of VGR3938 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3938 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3938 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3938 gene: VGAM2602 host target protein, VGAM2753 host target protein, VGAM2856 host target protein, VGAM2943 host target protein, VGAM2944 host target protein, VGAM2969 host target protein, VGAM3010 host target protein and VGAM3066 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2602, VGAM2753, VGAM2856, VGAM2943, VGAM2944, VGAM2969, VGAM3010 and VGAM3066

[54991] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3939(VGR3939) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[54992] VGR3939 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3939 gene was detected is described hereinabove with reference to Figs. 6–15.

[54993] VGR3939 gene encodes VGR3939 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[54994] VGR3939 precursor RNA folds spatially, forming VGR3939 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3939 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3939 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[54995] VGR3939 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3067 precursor RNA, VGAM3097 precursor RNA, VGAM3098 precursor RNA, VGAM3126 precursor RNA, VGAM3215 precursor RNA, VGAM3339 precursor RNA, VGAM3368 precursor RNA and VGAM3382 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[54996] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3067 RNA, VGAM3097 RNA, VGAM3098 RNA, VGAM3126 RNA, VGAM3215 RNA, VGAM3339 RNA, VGAM3368 RNA and

VGAM3382 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[54997] VGAM3067 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3067 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3067 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3067 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[54998] VGAM3097 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3097 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3097 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3097 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[54999] VGAM3098 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3098 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3098 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3098 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55000] VGAM3126 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3126 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3126 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3126 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55001] VGAM3215 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3215 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3215 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3215 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55002] VGAM3339 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3339 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3339 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3339 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55003] VGAM3368 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3368 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3368 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3368 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55004] VGAM3382 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3382 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3382 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3382 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55005] It is appreciated that a function of VGR3939 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3939 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3939 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3939 gene: VGAM3067 host target protein, VGAM3097 host target protein, VGAM3098 host target protein, VGAM3126 host target protein, VGAM3215 host target protein, VGAM3339 host target protein, VGAM3368 host target protein and

VGAM3382 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3067, VGAM3097, VGAM3098, VGAM3126, VGAM3215, VGAM3339, VGAM3368 and VGAM3382

[55006] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3940(VGR3940) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55007] VGR3940 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3940 gene was detected is described hereinabove with reference to Figs. 6-15.

[55008] VGR3940 gene encodes VGR3940 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55009] VGR3940 precursor RNA folds spatially, forming VGR3940 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3940 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3940 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55010] VGR3940 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3438 precursor RNA, VGAM3451 precursor RNA, VGAM3518 precursor RNA, VGAM3531 precursor RNA, VGAM3552 precursor RNA, VGAM3620 precursor RNA, VGAM3636 precursor RNA and VGAM3648 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55011] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3438 RNA, VGAM3451 RNA, VGAM3518 RNA, VGAM3531 RNA, VGAM3552 RNA, VGAM3620 RNA, VGAM3636 RNA and VGAM3648 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55012] VGAM3438 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3438 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3438 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3438 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[55013] VGAM3451 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3451 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3451 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3451 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55014] VGAM3518 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3518 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3518 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3518 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55015] VGAM3531 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3531 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3531 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3531 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55016] VGAM3552 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3552 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3552 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM3552 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55017] VGAM3620 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3620 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3620 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3620 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55018] VGAM3636 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3636 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3636 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM3636 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55019] VGAM3648 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3648 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3648 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3648 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55020] It is appreciated that a function of VGR3940 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3940 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3940 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3940 gene: VGAM3438 host target protein, VGAM3451 host target protein, VGAM3518 host target protein, VGAM3531 host target protein, VGAM3552 host target protein, VGAM3620 host target protein, VGAM3636 host target protein and VGAM3648 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3438, VGAM3451, VGAM3518, VGAM3531, VGAM3552, VGAM3620, VGAM3636 and VGAM3648

[55021] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3941(VGR3941) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55022] VGR3941 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3941 gene was detected is described hereinabove with reference to Figs. 6–15.

[55023] VGR3941 gene encodes VGR3941 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55024] VGR3941 precursor RNA folds spatially, forming VGR3941 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3941 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3941 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55025] VGR3941 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM3654 precursor RNA, VGAM3755 precursor RNA, VGAM3765 precursor RNA, VGAM3792 pre–

cursor RNA and VGAM3799 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55026] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3654 RNA, VGAM3755 RNA, VGAM3765 RNA, VGAM3792 RNA and VGAM3799 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55027] VGAM3654 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3654 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3654 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM3654 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55028] VGAM3755 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3755 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3755 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3755 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55029] VGAM3765 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3765 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3765 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM3765 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55030] VGAM3792 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3792 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3792 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3792 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55031] VGAM3799 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3799 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3799 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3799 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55032] It is appreciated that a function of VGR3941 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3941 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3941 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3941 gene: VGAM3654 host target protein, VGAM3755 host target protein, VGAM3765 host target protein, VGAM3792 host target protein and VGAM3799 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3654, VGAM3755, VGAM3765, VGAM3792 and VGAM3799

[55033] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3942(VGR3942) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55034] VGR3942 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3942 gene was detected is described hereinabove with reference to Figs. 6–15.

[55035] VGR3942 gene encodes VGR3942 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55036] VGR3942 precursor RNA folds spatially, forming VGR3942 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3942 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3942 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55037] VGR3942 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2902 precursor RNA and VGAM3512 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55038] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2902 RNA and VGAM3512 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55039] VGAM2902 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2902 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2902 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2902 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55040] VGAM3512 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3512 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3512 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3512 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55041] It is appreciated that a function of VGR3942 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3942 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3942 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3942 gene: VGAM2902 host target protein and VGAM3512 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2902 and VGAM3512

[55042] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3943(VGR3943) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55043] VGR3943 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3943 gene was detected is described hereinabove with reference to Figs. 6–15.

[55044] VGR3943 gene encodes VGR3943 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55045] VGR3943 precursor RNA folds spatially, forming VGR3943 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3943 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3943 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55046] VGR3943 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM965 precursor RNA, VGAM967 precursor RNA, VGAM968 precursor RNA, VGAM969 precursor RNA, VGAM2632 precursor RNA and VGAM2633 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55047] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM965 RNA, VGAM967 RNA, VGAM968 RNA, VGAM969 RNA, VGAM2632 RNA and VGAM2633 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55048] VGAM965 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM965 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM965 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM965 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55049] VGAM967 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM967 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM967 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM967 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55050] VGAM968 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM968 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM968 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM968 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55051] VGAM969 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM969 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM969 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM969 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55052] VGAM2632 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2632 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2632 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2632 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55053] VGAM2633 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2633 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2633 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2633 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55054] It is appreciated that a function of VGR3943 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3943 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3943 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3943 gene: VGAM965 host target protein, VGAM967 host target protein, VGAM968

host target protein, VGAM969 host target protein, VGAM2632 host target protein and VGAM2633 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM965, VGAM967, VGAM968, VGAM969, VGAM2632 and VGAM2633

[55055] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3944(VGR3944) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55056] VGR3944 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3944 gene was detected is described hereinabove with reference to Figs. 6–15.

[55057] VGR3944 gene encodes VGR3944 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[55058] VGR3944 precursor RNA folds spatially, forming VGR3944 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3944 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3944 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55059] VGR3944 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM505 precursor RNA, VGAM506 precursor RNA, VGAM507 precursor RNA and VGAM508 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55060] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM505 RNA, VGAM506 RNA, VGAM507 RNA and VGAM508 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55061] VGAM505 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM505 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM505 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM505 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55062] VGAM506 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM506 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM506 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM506 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55063] VGAM507 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM507 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM507 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM507 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55064] VGAM508 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM508 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM508 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM508 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55065] It is appreciated that a function of VGR3944 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3944 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3944 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3944 gene: VGAM505 host target protein, VGAM506 host target protein, VGAM507 host target protein and VGAM508 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respec-

tively. The function of these host target genes is elaborated hereinabove with reference to VGAM505, VGAM506, VGAM507 and VGAM508

[55066] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3945(VGR3945) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55067] VGR3945 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3945 gene was detected is described hereinabove with reference to Figs. 6–15.

[55068] VGR3945 gene encodes VGR3945 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55069] VGR3945 precursor RNA folds spatially, forming VGR3945 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3945 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3945 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55070] VGR3945 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1799 precursor RNA, VGAM1800 precursor RNA, VGAM1802 precursor RNA, VGAM2685 precursor RNA, VGAM2686 precursor RNA and VGAM3586 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55071] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1799 RNA, VGAM1800 RNA, VGAM1802 RNA, VGAM2685 RNA,

VGAM2686 RNA and VGAM3586 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55072] VGAM1799 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1799 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1799 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1799 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55073] VGAM1800 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1800 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1800 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1800 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55074] VGAM1802 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1802 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1802 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1802 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55075] VGAM2685 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2685 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2685 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2685 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55076] VGAM2686 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2686 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2686 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2686 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55077] VGAM3586 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3586 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3586 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3586 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55078] It is appreciated that a function of VGR3945 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3945 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3945 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3945 gene: VGAM1799 host target protein, VGAM1800 host target protein, VGAM1802 host target protein, VGAM2685 host target protein, VGAM2686 host target protein and VGAM3586 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1799, VGAM1800, VGAM1802, VGAM2685, VGAM2686 and VGAM3586

[55079] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3946(VGR3946) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55080] VGR3946 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3946 gene was detected is described hereinabove with reference to Figs. 6–15.

[55081] VGR3946 gene encodes VGR3946 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55082] VGR3946 precursor RNA folds spatially, forming VGR3946 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3946 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3946 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55083] VGR3946 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3348 precursor RNA and VGAM3614 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55084] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3348 RNA and VGAM3614 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM

RNA of Fig. 8.

[55085] VGAM3348 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3348 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3348 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3348 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55086] VGAM3614 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3614 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3614 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3614 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55087] It is appreciated that a function of VGR3946 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3946 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3946 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3946 gene: VGAM3348 host target protein and VGAM3614 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3348 and VGAM3614

[55088] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3947(VGR3947) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[55089] VGR3947 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3947 gene was detected is described hereinabove with reference to Figs. 6–15.

[55090] VGR3947 gene encodes VGR3947 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55091] VGR3947 precursor RNA folds spatially, forming VGR3947 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3947 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3947 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55092] VGR3947 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2708 precursor RNA and VGAM3340 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55093] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2708 RNA and VGAM3340 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55094] VGAM2708 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2708 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2708 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM2708 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55095] VGAM3340 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3340 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3340 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3340 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55096] It is appreciated that a function of VGR3947 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3947 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3947 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3947 gene: VGAM2708 host target protein and VGAM3340 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2708 and VGAM3340

[55097] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3948(VGR3948) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55098] VGR3948 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3948 gene was detected is described hereinabove with reference to Figs. 6-15.

[55099] VGR3948 gene encodes VGR3948 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55100] VGR3948 precursor RNA folds spatially, forming VGR3948 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3948 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3948 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55101] VGR3948 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM277 precursor RNA, VGAM650 precursor RNA, VGAM653 precursor RNA, VGAM821 precursor RNA, VGAM1014 precursor RNA, VGAM1015 precursor RNA, VGAM1102 precursor RNA and VGAM1205 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a

hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55102] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM277 RNA, VGAM650 RNA, VGAM653 RNA, VGAM821 RNA, VGAM1014 RNA, VGAM1015 RNA, VGAM1102 RNA and VGAM1205 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55103] VGAM277 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM277 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM277 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM277 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[55104] VGAM650 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM650 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM650 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM650 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55105] VGAM653 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM653 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM653 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM653 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55106] VGAM821 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM821 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM821 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM821 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55107] VGAM1014 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1014 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1014 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM1014 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55108] VGAM1015 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1015 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1015 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1015 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55109] VGAM1102 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1102 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1102 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM1102 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55110] VGAM1205 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1205 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1205 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1205 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55111] It is appreciated that a function of VGR3948 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3948 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3948 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3948 gene: VGAM277 host target protein, VGAM650 host target protein, VGAM653 host target protein, VGAM821 host target protein, VGAM1014 host target protein, VGAM1015 host target protein, VGAM1102 host target protein and VGAM1205 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM277, VGAM650, VGAM653, VGAM821, VGAM1014, VGAM1015, VGAM1102 and VGAM1205

[55112] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3949(VGR3949) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55113] VGR3949 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3949 gene was detected is described hereinabove with reference to Figs. 6–15.

[55114] VGR3949 gene encodes VGR3949 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55115] VGR3949 precursor RNA folds spatially, forming VGR3949 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3949 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3949 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55116] VGR3949 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1207 precursor RNA, VGAM1208 precursor RNA, VGAM1210 precursor RNA, VGAM1211 precursor RNA, VGAM1212 precursor RNA, VGAM1214 pre–

cursor RNA, VGAM1223 precursor RNA and VGAM1334 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55117] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1207 RNA, VGAM1208 RNA, VGAM1210 RNA, VGAM1211 RNA, VGAM1212 RNA, VGAM1214 RNA, VGAM1223 RNA and VGAM1334 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55118] VGAM1207 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1207 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1207 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1207 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55119] VGAM1208 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1208 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1208 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1208 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55120] VGAM1210 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1210 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1210 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1210 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55121] VGAM1211 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1211 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1211 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1211 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55122] VGAM1212 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1212 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1212 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1212 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55123] VGAM1214 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1214 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1214 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1214 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55124] VGAM1223 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM1223 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1223 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1223 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55125] VGAM1334 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1334 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1334 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1334 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55126] It is appreciated that a function of VGR3949 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3949 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3949 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3949 gene: VGAM1207 host target protein, VGAM1208 host target protein, VGAM1210 host target protein, VGAM1211 host target protein, VGAM1212 host target protein, VGAM1214 host target protein, VGAM1223 host target protein and VGAM1334 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1207, VGAM1208, VGAM1210, VGAM1211, VGAM1212, VGAM1214, VGAM1223 and VGAM1334

[55127] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3950(VGR3950) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55128] VGR3950 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3950 gene was detected is described hereinabove with reference to Figs. 6–15.

[55129] VGR3950 gene encodes VGR3950 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55130] VGR3950 precursor RNA folds spatially, forming VGR3950 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3950 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3950 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[55131] VGR3950 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1366 precursor RNA, VGAM1369 precursor RNA, VGAM1370 precursor RNA, VGAM1371 precursor RNA, VGAM1372 precursor RNA, VGAM1374 precursor RNA, VGAM1466 precursor RNA and VGAM1468 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55132] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1366 RNA, VGAM1369 RNA, VGAM1370 RNA, VGAM1371 RNA, VGAM1372 RNA, VGAM1374 RNA, VGAM1466 RNA and VGAM1468 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55133] VGAM1366 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1366 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1366 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1366 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55134] VGAM1369 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1369 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1369 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1369 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55135] VGAM1370 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1370 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1370 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1370 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55136] VGAM1371 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1371 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1371 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1371 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55137] VGAM1372 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1372 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1372 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1372 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55138] VGAM1374 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1374 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1374 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1374 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55139] VGAM1466 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1466 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1466 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1466 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55140] VGAM1468 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1468 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1468 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1468 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55141] It is appreciated that a function of VGR3950 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3950 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3950 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3950 gene: VGAM1366 host target protein, VGAM1369 host target protein, VGAM1370 host target protein, VGAM1371 host target protein, VGAM1372 host target protein, VGAM1374 host target protein, VGAM1466 host target protein and VGAM1468 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1366, VGAM1369, VGAM1370, VGAM1371, VGAM1372, VGAM1374, VGAM1466 and VGAM1468

[55142] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3951(VGR3951) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55143] VGR3951 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3951 gene was detected is described hereinabove with reference to Figs. 6–15.

[55144] VGR3951 gene encodes VGR3951 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55145] VGR3951 precursor RNA folds spatially, forming VGR3951 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3951 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3951 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55146] VGR3951 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1622 precursor RNA, VGAM1626 precursor RNA, VGAM1628 precursor RNA, VGAM1825 precursor RNA, VGAM1826 precursor RNA, VGAM1828 precursor RNA, VGAM1871 precursor RNA and VGAM1948 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55147] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1622 RNA, VGAM1626 RNA, VGAM1628 RNA, VGAM1825 RNA, VGAM1826 RNA, VGAM1828 RNA, VGAM1871 RNA and VGAM1948 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55148] VGAM1622 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1622 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1622 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1622 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55149] VGAM1626 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM1626 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1626 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1626 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55150] VGAM1628 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1628 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1628 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1628 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55151] VGAM1825 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1825 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1825 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1825 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55152] VGAM1826 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1826 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1826 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1826 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55153] VGAM1828 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1828 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1828 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1828 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55154] VGAM1871 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1871 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1871 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1871 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[55155] VGAM1948 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1948 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1948 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1948 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55156] It is appreciated that a function of VGR3951 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3951 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3951 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3951 gene: VGAM1622

host target protein, VGAM1626 host target protein, VGAM1628 host target protein, VGAM1825 host target protein, VGAM1826 host target protein, VGAM1828 host target protein, VGAM1871 host target protein and VGAM1948 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1622, VGAM1626, VGAM1628, VGAM1825, VGAM1826, VGAM1828, VGAM1871 and VGAM1948

[55157] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3952(VGR3952) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55158] VGR3952 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3952 gene was detected is described hereinabove with reference to Figs.

6-15.

[55159] VGR3952 gene encodes VGR3952 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55160] VGR3952 precursor RNA folds spatially, forming VGR3952 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3952 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3952 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55161] VGR3952 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1992 precursor RNA, VGAM2133 precursor RNA, VGAM2134 precursor RNA, VGAM2147 precursor RNA, VGAM2287 precursor RNA, VGAM2497 precursor RNA, VGAM2541 precursor RNA and VGAM2588 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55162] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1992 RNA, VGAM2133 RNA, VGAM2134 RNA, VGAM2147 RNA, VGAM2287 RNA, VGAM2497 RNA, VGAM2541 RNA and VGAM2588 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55163] VGAM1992 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1992 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1992 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1992 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55164] VGAM2133 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2133 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2133 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2133 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55165] VGAM2134 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2134 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2134 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2134 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55166] VGAM2147 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2147 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2147 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2147 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55167] VGAM2287 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2287 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2287 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2287 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55168] VGAM2497 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2497 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2497 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2497 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55169] VGAM2541 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2541 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2541 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2541 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55170] VGAM2588 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2588 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2588 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2588 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55171] It is appreciated that a function of VGR3952 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR3952 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3952 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3952 gene: VGAM1992 host target protein, VGAM2133 host target protein, VGAM2134 host target protein, VGAM2147 host target protein, VGAM2287 host target protein, VGAM2497 host target protein, VGAM2541 host target protein and VGAM2588 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1992, VGAM2133, VGAM2134, VGAM2147, VGAM2287, VGAM2497, VGAM2541 and VGAM2588

[55172] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3953(VGR3953) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55173] VGR3953 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3953 gene was detected is described hereinabove with reference to Figs. 6–15.

[55174] VGR3953 gene encodes VGR3953 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55175] VGR3953 precursor RNA folds spatially, forming VGR3953 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3953 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3953 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55176] VGR3953 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2674 precursor RNA, VGAM2714 precursor RNA, VGAM2794 precursor RNA, VGAM2832 precursor RNA, VGAM2912 precursor RNA, VGAM2915 precursor RNA, VGAM2973 precursor RNA and VGAM2987 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55177] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2674 RNA, VGAM2714 RNA, VGAM2794 RNA, VGAM2832 RNA, VGAM2912 RNA, VGAM2915 RNA, VGAM2973 RNA and VGAM2987 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55178] VGAM2674 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2674 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2674 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2674 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55179] VGAM2714 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2714 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2714 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2714 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[55180] VGAM2794 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2794 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2794 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2794 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55181] VGAM2832 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2832 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2832 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2832 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55182] VGAM2912 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2912 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2912 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2912 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55183] VGAM2915 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2915 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2915 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2915 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55184] VGAM2973 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2973 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2973 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2973 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55185] VGAM2987 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2987 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2987 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM2987 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55186] It is appreciated that a function of VGR3953 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3953 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3953 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3953 gene: VGAM2674 host target protein, VGAM2714 host target protein, VGAM2794 host target protein, VGAM2832 host target protein, VGAM2912 host target protein, VGAM2915 host target protein, VGAM2973 host target protein and VGAM2987 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2674, VGAM2714, VGAM2794,

VGAM2832, VGAM2912, VGAM2915, VGAM2973 and VGAM2987

[55187] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3954(VGR3954) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55188] VGR3954 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3954 gene was detected is described hereinabove with reference to Figs. 6–15.

[55189] VGR3954 gene encodes VGR3954 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55190] VGR3954 precursor RNA folds spatially, forming VGR3954 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3954 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3954 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55191] VGR3954 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2988 precursor RNA, VGAM3005 precursor RNA, VGAM3036 precursor RNA, VGAM3038 precursor RNA, VGAM3109 precursor RNA, VGAM3123 precursor RNA, VGAM3124 precursor RNA and VGAM3199 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55192] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2988

RNA, VGAM3005 RNA, VGAM3036 RNA, VGAM3038 RNA, VGAM3109 RNA, VGAM3123 RNA, VGAM3124 RNA and VGAM3199 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55193] VGAM2988 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2988 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2988 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2988 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55194] VGAM3005 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3005 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3005 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3005 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55195] VGAM3036 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3036 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3036 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3036 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55196] VGAM3038 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3038 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3038 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3038 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55197] VGAM3109 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3109 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3109 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3109 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55198] VGAM3123 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM3123 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3123 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3123 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55199] VGAM3124 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3124 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3124 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3124 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55200] VGAM3199 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3199 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3199 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3199 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55201] It is appreciated that a function of VGR3954 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3954 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3954 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3954 gene: VGAM2988 host target protein, VGAM3005 host target protein, VGAM3036 host target protein, VGAM3038 host target

protein, VGAM3109 host target protein, VGAM3123 host target protein, VGAM3124 host target protein and VGAM3199 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2988, VGAM3005, VGAM3036, VGAM3038, VGAM3109, VGAM3123, VGAM3124 and VGAM3199

[55202] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3955(VGR3955) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55203] VGR3955 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3955 gene was detected is described hereinabove with reference to Figs. 6-15.

[55204] VGR3955 gene encodes VGR3955 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55205] VGR3955 precursor RNA folds spatially, forming VGR3955 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3955 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3955 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55206] VGR3955 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3200 precursor RNA, VGAM3218 precursor RNA, VGAM3251 precursor RNA, VGAM3315 precursor RNA, VGAM3316 precursor RNA, VGAM3554 precursor RNA, VGAM3634 precursor RNA and VGAM3689 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55207] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3200 RNA, VGAM3218 RNA, VGAM3251 RNA, VGAM3315 RNA, VGAM3316 RNA, VGAM3554 RNA, VGAM3634 RNA and VGAM3689 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55208] VGAM3200 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3200 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3200 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM3200 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55209] VGAM3218 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3218 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3218 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3218 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55210] VGAM3251 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3251 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3251 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM3251 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55211] VGAM3315 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3315 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3315 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3315 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55212] VGAM3316 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3316 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3316 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3316 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55213] VGAM3554 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3554 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3554 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3554 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55214] VGAM3634 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3634 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3634 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3634 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55215] VGAM3689 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3689 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3689 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3689 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55216] It is appreciated that a function of VGR3955 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3955 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3955 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3955 gene: VGAM3200 host target protein, VGAM3218 host target protein, VGAM3251 host target protein, VGAM3315 host target protein, VGAM3316 host target protein, VGAM3554 host target protein, VGAM3634 host target protein and VGAM3689 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3200, VGAM3218, VGAM3251, VGAM3315, VGAM3316, VGAM3554, VGAM3634 and VGAM3689

[55217] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3956(VGR3956) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[55218] VGR3956 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3956 gene was detected is described hereinabove with reference to Figs. 6–15.

[55219] VGR3956 gene encodes VGR3956 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55220] VGR3956 precursor RNA folds spatially, forming VGR3956 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3956 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3956 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55221] VGR3956 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM pre–

cursor RNAs, VGAM3693 precursor RNA, VGAM3734 precursor RNA, VGAM3736 precursor RNA, VGAM3781 precursor RNA and VGAM3819 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55222] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3693 RNA, VGAM3734 RNA, VGAM3736 RNA, VGAM3781 RNA and VGAM3819 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55223] VGAM3693 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3693 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3693 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3693 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55224] VGAM3734 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3734 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3734 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3734 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55225] VGAM3736 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3736 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3736 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3736 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55226] VGAM3781 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3781 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3781 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3781 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55227] VGAM3819 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3819 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3819 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3819 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55228] It is appreciated that a function of VGR3956 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3956 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3956 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3956 gene: VGAM3693 host target protein, VGAM3734 host target protein, VGAM3736 host target protein, VGAM3781 host target protein and VGAM3819 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated

hereinabove with reference to VGAM3693, VGAM3734, VGAM3736, VGAM3781 and VGAM3819

[55229] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3957(VGR3957) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55230] VGR3957 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3957 gene was detected is described hereinabove with reference to Figs. 6–15.

[55231] VGR3957 gene encodes VGR3957 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55232] VGR3957 precursor RNA folds spatially, forming VGR3957 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3957 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3957 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55233] VGR3957 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2064 precursor RNA, VGAM2065 precursor RNA, VGAM2066 precursor RNA, VGAM2067 precursor RNA and VGAM3234 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55234] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2064 RNA, VGAM2065 RNA, VGAM2066 RNA, VGAM2067 RNA and VGAM3234 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA,

VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55235] VGAM2064 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2064 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2064 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2064 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55236] VGAM2065 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2065 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2065 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM2065 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55237] VGAM2066 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2066 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2066 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2066 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55238] VGAM2067 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2067 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2067 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM2067 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55239] VGAM3234 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3234 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3234 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3234 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55240] It is appreciated that a function of VGR3957 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3957 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3957 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3957 gene: VGAM2064 host target protein, VGAM2065 host target protein, VGAM2066 host target protein, VGAM2067 host target protein and VGAM3234 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2064, VGAM2065, VGAM2066, VGAM2067 and VGAM3234

[55241] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3958(VGR3958) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55242] VGR3958 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3958 gene was detected is described hereinabove with reference to Figs.

6-15.

[55243] VGR3958 gene encodes VGR3958 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55244] VGR3958 precursor RNA folds spatially, forming VGR3958 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3958 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3958 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55245] VGR3958 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM112 precursor RNA, VGAM114 precursor RNA, VGAM119 precursor RNA, VGAM123 precursor RNA, VGAM124 precursor RNA, VGAM126 precursor RNA, VGAM128 precursor RNA and VGAM130 precursor RNA, herein schematically represented by VGAM1 PRECURSOR,

VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55246] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM112 RNA, VGAM114 RNA, VGAM119 RNA, VGAM123 RNA, VGAM124 RNA, VGAM126 RNA, VGAM128 RNA and VGAM130 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55247] VGAM112 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM112 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM112 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM112 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55248] VGAM114 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM114 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM114 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM114 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55249] VGAM119 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM119 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM119 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM119 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55250] VGAM123 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM123 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM123 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM123 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55251] VGAM124 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM124 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM124 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM124 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55252] VGAM126 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM126 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM126 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM126 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55253] VGAM128 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM128 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM128 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM128 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55254] VGAM130 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM130 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM130 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM130 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55255] It is appreciated that a function of VGR3958 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR3958 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3958 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3958 gene: VGAM112 host target protein, VGAM114 host target protein, VGAM119 host target protein, VGAM123 host target protein, VGAM124 host target protein, VGAM126 host target protein, VGAM128 host target protein and VGAM130 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM112, VGAM114, VGAM119, VGAM123, VGAM124, VGAM126, VGAM128 and VGAM130

[55256] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3959(VGR3959) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[55257] VGR3959 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3959 gene was detected is described hereinabove with reference to Figs. 6–15.

[55258] VGR3959 gene encodes VGR3959 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55259] VGR3959 precursor RNA folds spatially, forming VGR3959 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3959 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3959 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55260] VGR3959 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM132 precursor RNA, VGAM133 precursor RNA, VGAM135 precursor RNA, VGAM137 precursor RNA, VGAM141 precursor RNA, VGAM142 precursor RNA, VGAM144 precursor RNA and VGAM147 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55261] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM132 RNA, VGAM133 RNA, VGAM135 RNA, VGAM137 RNA, VGAM141 RNA, VGAM142 RNA, VGAM144 RNA and VGAM147 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55262] VGAM132 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM132 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM132 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM132 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55263] VGAM133 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM133 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM133 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM133 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55264] VGAM135 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM135 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM135 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM135 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55265] VGAM137 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM137 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM137 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM137 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[55266] VGAM141 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM141 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM141 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM141 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55267] VGAM142 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM142 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM142 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM142 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55268] VGAM144 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM144 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM144 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM144 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55269] VGAM147 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM147 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM147 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM147 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55270] It is appreciated that a function of VGR3959 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3959 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3959 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3959 gene: VGAM132 host target protein, VGAM133 host target protein, VGAM135 host target protein, VGAM137 host target protein, VGAM141 host target protein, VGAM142 host target protein, VGAM144 host target protein and VGAM147 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM132, VGAM133, VGAM135, VGAM137, VGAM141, VGAM142, VGAM144 and VGAM147

[55271] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3960(VGR3960) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55272] VGR3960 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3960 gene was detected is described hereinabove with reference to Figs. 6–15.

[55273] VGR3960 gene encodes VGR3960 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55274] VGR3960 precursor RNA folds spatially, forming VGR3960 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3960 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3960 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55275] VGR3960 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM149 precursor RNA, VGAM150 precursor RNA, VGAM153 precursor RNA, VGAM154 precursor RNA, VGAM155 precursor RNA and VGAM156 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55276] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM149 RNA, VGAM150 RNA, VGAM153 RNA, VGAM154 RNA, VGAM155 RNA and VGAM156 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA

respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55277] VGAM149 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM149 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM149 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM149 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55278] VGAM150 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM150 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM150 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM150 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55279] VGAM153 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM153 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM153 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM153 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55280] VGAM154 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM154 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM154 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM154 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55281] VGAM155 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM155 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM155 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM155 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55282] VGAM156 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM156 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM156 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM156 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55283] It is appreciated that a function of VGR3960 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3960 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3960 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3960 gene: VGAM149 host target protein, VGAM150 host target protein, VGAM153 host target protein, VGAM154 host target protein, VGAM155 host target protein and VGAM156 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM149, VGAM150, VGAM153, VGAM154, VGAM155 and VGAM156

[55284] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3961(VGR3961) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55285] VGR3961 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3961 gene was detected is described hereinabove with reference to Figs. 6–15.

[55286] VGR3961 gene encodes VGR3961 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55287] VGR3961 precursor RNA folds spatially, forming VGR3961 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3961 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3961 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55288] VGR3961 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM158 precursor RNA, VGAM159 precursor RNA, VGAM161 precursor RNA, VGAM162 precursor RNA, VGAM165 precursor RNA, VGAM166 precursor RNA, VGAM167 precursor RNA and VGAM168 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55289] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM158 RNA, VGAM159 RNA, VGAM161 RNA, VGAM162 RNA, VGAM165 RNA, VGAM166 RNA, VGAM167 RNA and

VGAM168 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55290] VGAM158 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM158 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM158 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM158 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55291] VGAM159 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM159 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM159 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM159 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55292] VGAM161 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM161 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM161 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM161 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55293] VGAM162 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM162 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM162 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM162 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55294] VGAM165 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM165 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM165 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM165 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55295] VGAM166 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM166 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM166 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM166 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55296] VGAM167 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM167 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM167 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM167 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55297] VGAM168 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM168 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM168 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM168 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55298] It is appreciated that a function of VGR3961 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3961 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3961 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3961 gene: VGAM158 host target protein, VGAM159 host target protein, VGAM161 host target protein, VGAM162 host target protein, VGAM165 host target protein, VGAM166 host target protein, VGAM167 host target protein and VGAM168 host

target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM158, VGAM159, VGAM161, VGAM162, VGAM165, VGAM166, VGAM167 and VGAM168

[55299] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3962(VGR3962) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55300] VGR3962 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3962 gene was detected is described hereinabove with reference to Figs. 6-15.

[55301] VGR3962 gene encodes VGR3962 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55302] VGR3962 precursor RNA folds spatially, forming VGR3962

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3962 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3962 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55303] VGR3962 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM170 precursor RNA, VGAM171 precursor RNA, VGAM174 precursor RNA, VGAM175 precursor RNA, VGAM176 precursor RNA, VGAM178 precursor RNA, VGAM180 precursor RNA and VGAM181 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECUR-

SOR RNA of Fig. 8.

[55304] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM170 RNA, VGAM171 RNA, VGAM174 RNA, VGAM175 RNA, VGAM176 RNA, VGAM178 RNA, VGAM180 RNA and VGAM181 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55305] VGAM170 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM170 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM170 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM170 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55306] VGAM171 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM171 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM171 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM171 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55307] VGAM174 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM174 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM174 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM174 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[55308] VGAM175 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM175 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM175 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM175 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55309] VGAM176 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM176 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM176 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM176 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55310] VGAM178 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM178 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM178 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM178 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55311] VGAM180 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM180 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM180 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM180 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55312] VGAM181 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM181 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM181 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM181 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55313] It is appreciated that a function of VGR3962 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3962 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3962 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3962 gene: VGAM170 host target protein, VGAM171 host target protein, VGAM174 host target protein, VGAM175 host target protein, VGAM176 host target protein, VGAM178 host target protein, VGAM180 host target protein and VGAM181 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM170, VGAM171, VGAM174, VGAM175, VGAM176, VGAM178, VGAM180 and VGAM181

[55314] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3963(VGR3963) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55315] VGR3963 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3963 gene was

detected is described hereinabove with reference to Figs. 6–15.

[55316] VGR3963 gene encodes VGR3963 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55317] VGR3963 precursor RNA folds spatially, forming VGR3963 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3963 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3963 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55318] VGR3963 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM182 precursor RNA, VGAM183 precursor RNA, VGAM184 precursor RNA, VGAM185 precursor RNA, VGAM186 precursor RNA, VGAM187 precursor RNA, VGAM188 precursor RNA and VGAM189 precursor RNA,

herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55319] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM182 RNA, VGAM183 RNA, VGAM184 RNA, VGAM185 RNA, VGAM186 RNA, VGAM187 RNA, VGAM188 RNA and VGAM189 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55320] VGAM182 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM182 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM182 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM182 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55321] VGAM183 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM183 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM183 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM183 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55322] VGAM184 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM184 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM184 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM184 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55323] VGAM185 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM185 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM185 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM185 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55324] VGAM186 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM186 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM186 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM186 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55325] VGAM187 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM187 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM187 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM187 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55326] VGAM188 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM188 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM188 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM188 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55327] VGAM189 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM189 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM189 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM189 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55328] It is appreciated that a function of VGR3963 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3963 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3963 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3963 gene: VGAM182 host target protein, VGAM183 host target protein, VGAM184 host target protein, VGAM185 host target protein, VGAM186 host target protein, VGAM187 host target protein, VGAM188 host target protein and VGAM189 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM182, VGAM183, VGAM184, VGAM185, VGAM186, VGAM187, VGAM188 and VGAM189

[55329] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3964(VGR3964) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55330] VGR3964 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3964 gene was detected is described hereinabove with reference to Figs. 6–15.

[55331] VGR3964 gene encodes VGR3964 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55332] VGR3964 precursor RNA folds spatially, forming VGR3964 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3964 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3964 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55333] VGR3964 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM190 precursor RNA, VGAM191 precursor RNA, VGAM192 precursor RNA, VGAM193 precursor RNA, VGAM2647 precursor RNA and VGAM2648 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55334] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM190 RNA, VGAM191 RNA, VGAM192 RNA, VGAM193 RNA, VGAM2647 RNA and VGAM2648 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55335] VGAM190 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM190 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM190 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM190 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55336] VGAM191 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM191 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM191 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM191 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55337] VGAM192 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM192 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM192 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM192 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55338] VGAM193 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM193 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM193 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM193 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55339] VGAM2647 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2647 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2647 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2647 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55340] VGAM2648 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2648 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2648 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2648 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55341] It is appreciated that a function of VGR3964 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3964 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3964 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3964 gene: VGAM190 host target protein, VGAM191 host target protein, VGAM192 host target protein, VGAM193 host target protein, VGAM2647 host target protein and VGAM2648 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM190, VGAM191, VGAM192, VGAM193, VGAM2647 and VGAM2648

[55342] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3965(VGR3965) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55343] VGR3965 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3965 gene was detected is described hereinabove with reference to Figs. 6–15.

[55344] VGR3965 gene encodes VGR3965 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55345] VGR3965 precursor RNA folds spatially, forming VGR3965 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3965 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3965 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55346] VGR3965 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1784 precursor RNA, VGAM1785 precursor RNA and VGAM1787 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55347] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1784 RNA, VGAM1785 RNA and VGAM1787 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55348] VGAM1784 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1784 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1784 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1784 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55349] VGAM1785 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1785 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1785 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1785 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55350] VGAM1787 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1787 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1787 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1787 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55351] It is appreciated that a function of VGR3965 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3965 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3965 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3965 gene: VGAM1784 host target protein, VGAM1785 host target protein and VGAM1787 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1784, VGAM1785 and VGAM1787

[55352] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3966(VGR3966) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55353] VGR3966 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3966 gene was detected is described hereinabove with reference to Figs. 6–15.

[55354] VGR3966 gene encodes VGR3966 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55355] VGR3966 precursor RNA folds spatially, forming VGR3966 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3966 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3966 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55356] VGR3966 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2098 precursor RNA, VGAM2100 precursor RNA, VGAM2102 precursor RNA and VGAM2551 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55357] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2098 RNA, VGAM2100 RNA, VGAM2102 RNA and VGAM2551 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55358] VGAM2098 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2098 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2098 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2098 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55359] VGAM2100 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2100 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2100 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2100 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[55360] VGAM2102 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2102 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2102 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2102 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55361] VGAM2551 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2551 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2551 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2551 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55362] It is appreciated that a function of VGR3966 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3966 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3966 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3966 gene: VGAM2098 host target protein, VGAM2100 host target protein, VGAM2102 host target protein and VGAM2551 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2098, VGAM2100, VGAM2102 and VGAM2551

[55363] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3967(VGR3967) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55364] VGR3967 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3967 gene was detected is described hereinabove with reference to Figs. 6–15.

[55365] VGR3967 gene encodes VGR3967 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55366] VGR3967 precursor RNA folds spatially, forming VGR3967 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3967 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3967 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55367] VGR3967 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1249 precursor RNA and VGAM1250 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55368] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1249 RNA and VGAM1250 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55369] VGAM1249 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1249 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1249 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1249 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55370] VGAM1250 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1250 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1250 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1250 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55371] It is appreciated that a function of VGR3967 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3967 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3967

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3967 gene: VGAM1249 host target protein and VGAM1250 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1249 and VGAM1250

[55372] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3968(VGR3968) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55373] VGR3968 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3968 gene was detected is described hereinabove with reference to Figs. 6-15.

[55374] VGR3968 gene encodes VGR3968 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55375] VGR3968 precursor RNA folds spatially, forming VGR3968 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3968 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3968 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55376] VGR3968 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1439 precursor RNA, VGAM1441 precursor RNA, VGAM1444 precursor RNA, VGAM1445 precursor RNA, VGAM2387 precursor RNA, VGAM2863 precursor RNA and VGAM3055 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRE-

CURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55377] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1439 RNA, VGAM1441 RNA, VGAM1444 RNA, VGAM1445 RNA, VGAM2387 RNA, VGAM2863 RNA and VGAM3055 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55378] VGAM1439 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1439 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1439 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1439 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[55379] VGAM1441 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1441 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1441 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1441 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55380] VGAM1444 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1444 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1444 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1444 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55381] VGAM1445 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1445 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1445 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1445 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55382] VGAM2387 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2387 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2387 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM2387 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55383] VGAM2863 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2863 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2863 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2863 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55384] VGAM3055 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3055 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3055 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM3055 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55385] It is appreciated that a function of VGR3968 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3968 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3968 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3968 gene: VGAM1439 host target protein, VGAM1441 host target protein, VGAM1444 host target protein, VGAM1445 host target protein, VGAM2387 host target protein, VGAM2863 host target protein and VGAM3055 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1439, VGAM1441, VGAM1444, VGAM1445, VGAM2387, VGAM2863 and

VGAM3055

[55386] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3969(VGR3969) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55387] VGR3969 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3969 gene was detected is described hereinabove with reference to Figs. 6–15.

[55388] VGR3969 gene encodes VGR3969 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55389] VGR3969 precursor RNA folds spatially, forming VGR3969 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3969 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR3969 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55390] VGR3969 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM199 precursor RNA, VGAM211 precursor RNA, VGAM329 precursor RNA, VGAM518 precursor RNA, VGAM607 precursor RNA, VGAM608 precursor RNA, VGAM867 precursor RNA and VGAM868 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55391] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM199 RNA, VGAM211 RNA, VGAM329 RNA, VGAM518 RNA,

VGAM607 RNA, VGAM608 RNA, VGAM867 RNA and VGAM868 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55392] VGAM199 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM199 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM199 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM199 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55393] VGAM211 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM211 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM211 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM211 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55394] VGAM329 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM329 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM329 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM329 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55395] VGAM518 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM518 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM518 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM518 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55396] VGAM607 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM607 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM607 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM607 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55397] VGAM608 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM608 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM608 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM608 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55398] VGAM867 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM867 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM867 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM867 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55399] VGAM868 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM868 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM868 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM868 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55400] It is appreciated that a function of VGR3969 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3969 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3969 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3969 gene: VGAM199 host target protein, VGAM211 host target protein, VGAM329 host target protein, VGAM518 host target protein, VGAM607 host target protein, VGAM608 host target pro-

tein, VGAM867 host target protein and VGAM868 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM199, VGAM211, VGAM329, VGAM518, VGAM607, VGAM608, VGAM867 and VGAM868

[55401] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3970(VGR3970) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55402] VGR3970 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3970 gene was detected is described hereinabove with reference to Figs. 6-15.

[55403] VGR3970 gene encodes VGR3970 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55404] VGR3970 precursor RNA folds spatially, forming VGR3970 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3970 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3970 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55405] VGR3970 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM869 precursor RNA, VGAM1016 precursor RNA, VGAM1107 precursor RNA, VGAM1132 precursor RNA, VGAM1133 precursor RNA, VGAM1137 precursor RNA, VGAM1232 precursor RNA and VGAM1234 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55406] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM869 RNA, VGAM1016 RNA, VGAM1107 RNA, VGAM1132 RNA, VGAM1133 RNA, VGAM1137 RNA, VGAM1232 RNA and VGAM1234 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55407] VGAM869 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM869 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM869 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM869 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[55408] VGAM1016 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1016 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1016 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1016 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55409] VGAM1107 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1107 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1107 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1107 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55410] VGAM1132 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1132 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1132 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1132 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55411] VGAM1133 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1133 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1133 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM1133 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55412] VGAM1137 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1137 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1137 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1137 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55413] VGAM1232 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1232 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1232 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM1232 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55414] VGAM1234 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1234 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1234 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1234 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55415] It is appreciated that a function of VGR3970 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3970 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3970 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3970 gene: VGAM869 host target protein, VGAM1016 host target protein, VGAM1107 host target protein, VGAM1132 host target protein, VGAM1133 host target protein, VGAM1137 host target protein, VGAM1232 host target protein and VGAM1234 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM869, VGAM1016, VGAM1107, VGAM1132, VGAM1133, VGAM1137, VGAM1232 and VGAM1234

[55416] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3971(VGR3971) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55417] VGR3971 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3971 gene was detected is described hereinabove with reference to Figs. 6–15.

[55418] VGR3971 gene encodes VGR3971 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55419] VGR3971 precursor RNA folds spatially, forming VGR3971 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3971 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3971 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55420] VGR3971 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1246 precursor RNA, VGAM1248 precursor RNA, VGAM1340 precursor RNA, VGAM1342 precursor RNA, VGAM1345 precursor RNA, VGAM1347 pre–

cursor RNA, VGAM1349 precursor RNA and VGAM1350 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55421] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1246 RNA, VGAM1248 RNA, VGAM1340 RNA, VGAM1342 RNA, VGAM1345 RNA, VGAM1347 RNA, VGAM1349 RNA and VGAM1350 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55422] VGAM1246 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1246 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1246 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1246 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55423] VGAM1248 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1248 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1248 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1248 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55424] VGAM1340 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1340 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1340 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1340 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55425] VGAM1342 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1342 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1342 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1342 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55426] VGAM1345 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1345 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1345 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1345 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55427] VGAM1347 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1347 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1347 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1347 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55428] VGAM1349 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM1349 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1349 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1349 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55429] VGAM1350 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1350 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1350 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1350 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55430] It is appreciated that a function of VGR3971 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3971 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3971 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3971 gene: VGAM1246 host target protein, VGAM1248 host target protein, VGAM1340 host target protein, VGAM1342 host target protein, VGAM1345 host target protein, VGAM1347 host target protein, VGAM1349 host target protein and VGAM1350 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1246, VGAM1248, VGAM1340, VGAM1342, VGAM1345, VGAM1347, VGAM1349 and VGAM1350

[55431] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3972(VGR3972) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55432] VGR3972 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3972 gene was detected is described hereinabove with reference to Figs. 6–15.

[55433] VGR3972 gene encodes VGR3972 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55434] VGR3972 precursor RNA folds spatially, forming VGR3972 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3972 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3972 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[55435] VGR3972 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1446 precursor RNA, VGAM1447 precursor RNA, VGAM1449 precursor RNA, VGAM1607 precursor RNA, VGAM1609 precursor RNA, VGAM1730 precursor RNA, VGAM1733 precursor RNA and VGAM1734 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55436] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1446 RNA, VGAM1447 RNA, VGAM1449 RNA, VGAM1607 RNA, VGAM1609 RNA, VGAM1730 RNA, VGAM1733 RNA and VGAM1734 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55437] VGAM1446 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1446 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1446 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1446 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55438] VGAM1447 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1447 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1447 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1447 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55439] VGAM1449 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1449 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1449 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1449 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55440] VGAM1607 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1607 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1607 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1607 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55441] VGAM1609 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1609 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1609 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1609 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55442] VGAM1730 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1730 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1730 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1730 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55443] VGAM1733 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1733 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1733 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1733 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55444] VGAM1734 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1734 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1734 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1734 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55445] It is appreciated that a function of VGR3972 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3972 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3972 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3972 gene: VGAM1446 host target protein, VGAM1447 host target protein, VGAM1449 host target protein, VGAM1607 host target protein, VGAM1609 host target protein, VGAM1730 host target protein, VGAM1733 host target protein and VGAM1734 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1446, VGAM1447, VGAM1449, VGAM1607, VGAM1609, VGAM1730, VGAM1733 and VGAM1734

[55446] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3973(VGR3973) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55447] VGR3973 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3973 gene was detected is described hereinabove with reference to Figs. 6–15.

[55448] VGR3973 gene encodes VGR3973 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55449] VGR3973 precursor RNA folds spatially, forming VGR3973 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3973 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3973 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55450] VGR3973 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1735 precursor RNA, VGAM1737 precursor RNA, VGAM1738 precursor RNA, VGAM1803 precursor RNA, VGAM1804 precursor RNA, VGAM1984 precursor RNA, VGAM2131 precursor RNA and VGAM2218 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55451] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1735 RNA, VGAM1737 RNA, VGAM1738 RNA, VGAM1803 RNA, VGAM1804 RNA, VGAM1984 RNA, VGAM2131 RNA and VGAM2218 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55452] VGAM1735 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1735 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1735 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1735 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55453] VGAM1737 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM1737 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1737 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1737 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55454] VGAM1738 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1738 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1738 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1738 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55455] VGAM1803 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1803 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1803 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1803 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55456] VGAM1804 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1804 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1804 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1804 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55457] VGAM1984 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1984 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1984 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1984 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55458] VGAM2131 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2131 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2131 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2131 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[55459] VGAM2218 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2218 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2218 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2218 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55460] It is appreciated that a function of VGR3973 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3973 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3973 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3973 gene: VGAM1735

host target protein, VGAM1737 host target protein, VGAM1738 host target protein, VGAM1803 host target protein, VGAM1804 host target protein, VGAM1984 host target protein, VGAM2131 host target protein and VGAM2218 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1735, VGAM1737, VGAM1738, VGAM1803, VGAM1804, VGAM1984, VGAM2131 and VGAM2218

[55461] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3974(VGR3974) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55462] VGR3974 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3974 gene was detected is described hereinabove with reference to Figs.

6-15.

[55463] VGR3974 gene encodes VGR3974 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55464] VGR3974 precursor RNA folds spatially, forming VGR3974 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3974 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3974 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55465] VGR3974 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2219 precursor RNA, VGAM2257 precursor RNA, VGAM2258 precursor RNA, VGAM2272 precursor RNA, VGAM2273 precursor RNA, VGAM2304 precursor RNA, VGAM2310 precursor RNA and VGAM2354 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55466] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2219 RNA, VGAM2257 RNA, VGAM2258 RNA, VGAM2272 RNA, VGAM2273 RNA, VGAM2304 RNA, VGAM2310 RNA and VGAM2354 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55467] VGAM2219 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2219 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2219 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2219 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55468] VGAM2257 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2257 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2257 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2257 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55469] VGAM2258 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2258 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2258 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2258 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55470] VGAM2272 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2272 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2272 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2272 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55471] VGAM2273 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2273 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2273 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2273 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55472] VGAM2304 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2304 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2304 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2304 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55473] VGAM2310 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2310 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2310 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2310 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55474] VGAM2354 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2354 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2354 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2354 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55475] It is appreciated that a function of VGR3974 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR3974 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3974 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3974 gene: VGAM2219 host target protein, VGAM2257 host target protein, VGAM2258 host target protein, VGAM2272 host target protein, VGAM2273 host target protein, VGAM2304 host target protein, VGAM2310 host target protein and VGAM2354 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2219, VGAM2257, VGAM2258, VGAM2272, VGAM2273, VGAM2304, VGAM2310 and VGAM2354

[55476] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3975(VGR3975) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55477] VGR3975 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3975 gene was detected is described hereinabove with reference to Figs. 6–15.

[55478] VGR3975 gene encodes VGR3975 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55479] VGR3975 precursor RNA folds spatially, forming VGR3975 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3975 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3975 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55480] VGR3975 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2533 precursor RNA, VGAM2546 precursor RNA, VGAM2566 precursor RNA, VGAM2620 precursor RNA, VGAM2621 precursor RNA, VGAM2834 precursor RNA, VGAM2835 precursor RNA and VGAM3011 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55481] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2533 RNA, VGAM2546 RNA, VGAM2566 RNA, VGAM2620 RNA, VGAM2621 RNA, VGAM2834 RNA, VGAM2835 RNA and VGAM3011 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55482] VGAM2533 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2533 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2533 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2533 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55483] VGAM2546 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2546 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2546 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2546 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[55484] VGAM2566 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2566 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2566 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2566 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55485] VGAM2620 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2620 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2620 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2620 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55486] VGAM2621 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2621 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2621 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2621 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55487] VGAM2834 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2834 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2834 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2834 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55488] VGAM2835 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2835 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2835 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2835 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55489] VGAM3011 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3011 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3011 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM3011 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55490] It is appreciated that a function of VGR3975 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3975 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3975 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3975 gene: VGAM2533 host target protein, VGAM2546 host target protein, VGAM2566 host target protein, VGAM2620 host target protein, VGAM2621 host target protein, VGAM2834 host target protein, VGAM2835 host target protein and VGAM3011 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2533, VGAM2546, VGAM2566,

VGAM2620, VGAM2621, VGAM2834, VGAM2835 and VGAM3011

[55491] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3976(VGR3976) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55492] VGR3976 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3976 gene was detected is described hereinabove with reference to Figs. 6–15.

[55493] VGR3976 gene encodes VGR3976 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55494] VGR3976 precursor RNA folds spatially, forming VGR3976 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3976 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3976 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55495] VGR3976 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3091 precursor RNA and VGAM3092 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55496] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3091 RNA and VGAM3092 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55497] VGAM3091 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3091 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3091 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3091 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55498] VGAM3092 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3092 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3092 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3092 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55499] It is appreciated that a function of VGR3976 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3976 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3976 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3976 gene: VGAM3091 host target protein and VGAM3092 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3091 and VGAM3092

[55500] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3977(VGR3977) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55501] VGR3977 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3977 gene was detected is described hereinabove with reference to Figs. 6–15.

[55502] VGR3977 gene encodes VGR3977 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55503] VGR3977 precursor RNA folds spatially, forming VGR3977 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3977 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3977 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55504] VGR3977 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1707 precursor RNA, VGAM1711 pre–

cursor RNA, VGAM1714 precursor RNA and VGAM3006 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55505] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1707 RNA, VGAM1711 RNA, VGAM1714 RNA and VGAM3006 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55506] VGAM1707 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1707 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1707 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM1707 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55507] VGAM1711 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1711 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1711 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1711 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55508] VGAM1714 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1714 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1714 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1714 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55509] VGAM3006 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3006 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3006 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3006 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55510] It is appreciated that a function of VGR3977 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3977 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3977

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3977 gene: VGAM1707 host target protein, VGAM1711 host target protein, VGAM1714 host target protein and VGAM3006 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1707, VGAM1711, VGAM1714 and VGAM3006

[55511] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3978(VGR3978) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55512] VGR3978 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3978 gene was detected is described hereinabove with reference to Figs.

6-15.

[55513] VGR3978 gene encodes VGR3978 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55514] VGR3978 precursor RNA folds spatially, forming VGR3978 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3978 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3978 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55515] VGR3978 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1906 precursor RNA and VGAM3138 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECUR-

SOR RNA of Fig. 8.

[55516] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1906 RNA and VGAM3138 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55517] VGAM1906 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1906 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1906 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1906 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55518] VGAM3138 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3138 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3138 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3138 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55519] It is appreciated that a function of VGR3978 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3978 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3978 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3978 gene: VGAM1906 host target protein and VGAM3138 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated

hereinabove with reference to VGAM1906 and VGAM3138

[55520] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3979(VGR3979) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55521] VGR3979 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3979 gene was detected is described hereinabove with reference to Figs. 6–15.

[55522] VGR3979 gene encodes VGR3979 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55523] VGR3979 precursor RNA folds spatially, forming VGR3979 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3979 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR3979 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55524] VGR3979 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM459 precursor RNA, VGAM461 precursor RNA, VGAM462 precursor RNA, VGAM463 precursor RNA, VGAM934 precursor RNA, VGAM935 precursor RNA and VGAM1515 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55525] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM459 RNA, VGAM461 RNA, VGAM462 RNA, VGAM463 RNA, VGAM934 RNA, VGAM935 RNA and VGAM1515 RNA re-

spectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55526] VGAM459 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM459 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM459 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM459 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55527] VGAM461 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM461 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM461 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM461 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55528] VGAM462 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM462 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM462 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM462 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55529] VGAM463 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM463 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM463 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM463 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55530] VGAM934 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM934 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM934 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM934 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55531] VGAM935 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM935 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM935 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM935 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55532] VGAM1515 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1515 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1515 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1515 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55533] It is appreciated that a function of VGR3979 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3979 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3979 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3979 gene: VGAM459 host target protein, VGAM461 host target protein, VGAM462 host target protein, VGAM463 host target protein, VGAM934 host target protein, VGAM935 host target protein and VGAM1515 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated herein-above with reference to VGAM459, VGAM461, VGAM462, VGAM463, VGAM934, VGAM935 and VGAM1515

[55534] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3980(VGR3980) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55535] VGR3980 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3980 gene was detected is described hereinabove with reference to Figs. 6–15.

[55536] VGR3980 gene encodes VGR3980 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55537] VGR3980 precursor RNA folds spatially, forming VGR3980 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3980 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3980 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55538] VGR3980 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM695 precursor RNA, VGAM697 precursor

sor RNA, VGAM698 precursor RNA, VGAM863 precursor RNA, VGAM864 precursor RNA, VGAM865 precursor RNA, VGAM866 precursor RNA and VGAM1053 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55539] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM695 RNA, VGAM697 RNA, VGAM698 RNA, VGAM863 RNA, VGAM864 RNA, VGAM865 RNA, VGAM866 RNA and VGAM1053 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55540] VGAM695 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM695 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM695 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM695 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55541] VGAM697 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM697 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM697 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM697 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55542] VGAM698 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM698 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM698 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM698 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55543] VGAM863 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM863 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM863 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM863 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55544] VGAM864 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM864 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM864 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM864 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55545] VGAM865 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM865 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM865 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM865 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55546] VGAM866 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM866 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM866 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM866 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55547] VGAM1053 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1053 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1053 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1053 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[55548] It is appreciated that a function of VGR3980 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3980 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3980 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3980 gene: VGAM695 host target protein, VGAM697 host target protein, VGAM698 host target protein, VGAM863 host target protein, VGAM864 host target protein, VGAM865 host target protein, VGAM866 host target protein and VGAM1053 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM695, VGAM697, VGAM698, VGAM863, VGAM864, VGAM865, VGAM866 and VGAM1053

[55549] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 3981(VGR3981) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55550] VGR3981 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3981 gene was detected is described hereinabove with reference to Figs. 6-15.

[55551] VGR3981 gene encodes VGR3981 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55552] VGR3981 precursor RNA folds spatially, forming VGR3981 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3981 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3981 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55553] VGR3981 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1204 precursor RNA, VGAM1206 precursor RNA, VGAM1216 precursor RNA, VGAM1401 precursor RNA, VGAM1407 precursor RNA, VGAM1591 precursor RNA, VGAM1890 precursor RNA and VGAM1894 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55554] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1204 RNA, VGAM1206 RNA, VGAM1216 RNA, VGAM1401 RNA, VGAM1407 RNA, VGAM1591 RNA, VGAM1890 RNA and VGAM1894 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55555] VGAM1204 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1204 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1204 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1204 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55556] VGAM1206 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1206 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1206 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM1206 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55557] VGAM1216 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1216 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1216 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1216 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55558] VGAM1401 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1401 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1401 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1401 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55559] VGAM1407 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1407 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1407 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1407 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55560] VGAM1591 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1591 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1591 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1591 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55561] VGAM1890 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1890 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1890 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1890 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55562] VGAM1894 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1894 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1894 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1894 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55563] It is appreciated that a function of VGR3981 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3981 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3981 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3981 gene: VGAM1204 host target protein, VGAM1206 host target protein, VGAM1216 host target protein, VGAM1401 host target protein, VGAM1407 host target protein, VGAM1591 host target protein, VGAM1890 host target protein and VGAM1894 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through

VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1204, VGAM1206, VGAM1216, VGAM1401, VGAM1407, VGAM1591, VGAM1890 and VGAM1894

[55564] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3982(VGR3982) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55565] VGR3982 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3982 gene was detected is described hereinabove with reference to Figs. 6–15.

[55566] VGR3982 gene encodes VGR3982 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55567] VGR3982 precursor RNA folds spatially, forming VGR3982 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR3982 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3982 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55568] VGR3982 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1895 precursor RNA, VGAM1896 precursor RNA, VGAM1897 precursor RNA, VGAM1961 precursor RNA, VGAM2398 precursor RNA, VGAM2399 precursor RNA, VGAM2400 precursor RNA and VGAM2466 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55569] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1895 RNA, VGAM1896 RNA, VGAM1897 RNA, VGAM1961 RNA, VGAM2398 RNA, VGAM2399 RNA, VGAM2400 RNA and VGAM2466 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55570] VGAM1895 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1895 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1895 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1895 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55571] VGAM1896 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1896 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1896 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1896 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55572] VGAM1897 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1897 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1897 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1897 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55573] VGAM1961 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1961 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1961 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1961 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55574] VGAM2398 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2398 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2398 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2398 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[55575] VGAM2399 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2399 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2399 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2399 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55576] VGAM2400 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2400 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2400 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2400 host target protein, herein schematically

represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55577] VGAM2466 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2466 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2466 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2466 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55578] It is appreciated that a function of VGR3982 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3982 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3982 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR3982 gene: VGAM1895 host target protein, VGAM1896 host target protein, VGAM1897 host target protein, VGAM1961 host target protein, VGAM2398 host target protein, VGAM2399 host target protein, VGAM2400 host target protein and VGAM2466 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1895, VGAM1896, VGAM1897, VGAM1961, VGAM2398, VGAM2399, VGAM2400 and VGAM2466

[55579] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3983(VGR3983) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55580] VGR3983 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3983 gene was

detected is described hereinabove with reference to Figs. 6–15.

[55581] VGR3983 gene encodes VGR3983 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55582] VGR3983 precursor RNA folds spatially, forming VGR3983 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3983 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3983 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55583] VGR3983 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2754 precursor RNA, VGAM2795 precursor RNA, VGAM2796 precursor RNA, VGAM2797 precursor RNA, VGAM2927 precursor RNA, VGAM2964 precursor RNA, VGAM2968 precursor RNA and VGAM3051

precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55584] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2754 RNA, VGAM2795 RNA, VGAM2796 RNA, VGAM2797 RNA, VGAM2927 RNA, VGAM2964 RNA, VGAM2968 RNA and VGAM3051 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55585] VGAM2754 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2754 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2754 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2754 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55586] VGAM2795 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2795 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2795 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2795 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55587] VGAM2796 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2796 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2796 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2796 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55588] VGAM2797 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2797 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2797 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2797 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55589] VGAM2927 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2927 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2927 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2927 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55590] VGAM2964 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2964 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2964 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2964 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55591] VGAM2968 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2968 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2968 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2968 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55592] VGAM3051 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3051 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3051 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3051 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55593] It is appreciated that a function of VGR3983 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3983 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3983 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3983 gene: VGAM2754 host target protein, VGAM2795 host target protein, VGAM2796 host target protein, VGAM2797 host target protein, VGAM2927 host target protein, VGAM2964 host target protein, VGAM2968 host target protein and VGAM3051 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2754, VGAM2795, VGAM2796, VGAM2797, VGAM2927, VGAM2964, VGAM2968 and VGAM3051

[55594] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3984(VGR3984) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55595] VGR3984 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3984 gene was detected is described hereinabove with reference to Figs. 6–15.

[55596] VGR3984 gene encodes VGR3984 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55597] VGR3984 precursor RNA folds spatially, forming VGR3984 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3984 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3984 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55598] VGR3984 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3168 precursor RNA, VGAM3216 precursor RNA, VGAM3217 precursor RNA, VGAM3365 precursor RNA, VGAM3381 precursor RNA, VGAM3459 precursor RNA, VGAM3489 precursor RNA and VGAM3613 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55599] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3168 RNA, VGAM3216 RNA, VGAM3217 RNA, VGAM3365 RNA, VGAM3381 RNA, VGAM3459 RNA, VGAM3489 RNA and VGAM3613 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[55600] VGAM3168 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3168 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3168 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3168 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55601] VGAM3216 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3216 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3216 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3216 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55602] VGAM3217 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3217 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3217 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3217 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55603] VGAM3365 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3365 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3365 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM3365 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55604] VGAM3381 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3381 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3381 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3381 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55605] VGAM3459 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3459 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3459 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM3459 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55606] VGAM3489 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3489 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3489 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3489 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55607] VGAM3613 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3613 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3613 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3613 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55608] It is appreciated that a function of VGR3984 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3984 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3984 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3984 gene: VGAM3168 host target protein, VGAM3216 host target protein, VGAM3217 host target protein, VGAM3365 host target protein, VGAM3381 host target protein, VGAM3459 host target protein, VGAM3489 host target protein and VGAM3613 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM3168, VGAM3216, VGAM3217, VGAM3365, VGAM3381, VGAM3459, VGAM3489 and VGAM3613

[55609] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3985(VGR3985) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55610] VGR3985 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3985 gene was detected is described hereinabove with reference to Figs. 6-15.

[55611] VGR3985 gene encodes VGR3985 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55612] VGR3985 precursor RNA folds spatially, forming VGR3985 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3985 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3985 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55613] VGR3985 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3727 precursor RNA, VGAM3728 precursor RNA and VGAM3808 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55614] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3727 RNA, VGAM3728 RNA and VGAM3808 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM

RNAs corresponding to VGAM RNA of Fig. 8.

[55615] VGAM3727 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3727 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3727 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3727 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55616] VGAM3728 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3728 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3728 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3728 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55617] VGAM3808 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3808 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3808 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3808 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55618] It is appreciated that a function of VGR3985 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3985 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3985 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR3985 gene: VGAM3727 host target protein, VGAM3728 host target protein and VGAM3808 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3727, VGAM3728 and VGAM3808

[55619] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3986(VGR3986) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55620] VGR3986 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3986 gene was detected is described hereinabove with reference to Figs. 6-15.

[55621] VGR3986 gene encodes VGR3986 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55622] VGR3986 precursor RNA folds spatially, forming VGR3986 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3986 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3986 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55623] VGR3986 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM18 precursor RNA, VGAM23 precursor RNA, VGAM28 precursor RNA, VGAM99 precursor RNA, VGAM105 precursor RNA, VGAM106 precursor RNA, VGAM107 precursor RNA and VGAM110 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55624] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM18 RNA, VGAM23 RNA, VGAM28 RNA, VGAM99 RNA, VGAM105 RNA, VGAM106 RNA, VGAM107 RNA and VGAM110 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55625] VGAM18 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM18 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM18 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM18 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[55626] VGAM23 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM23 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM23 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM23 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55627] VGAM28 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM28 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM28 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM28 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55628] VGAM99 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM99 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM99 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM99 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55629] VGAM105 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM105 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM105 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM105 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55630] VGAM106 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM106 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM106 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM106 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55631] VGAM107 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM107 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM107 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM107 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55632] VGAM110 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM110 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM110 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM110 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55633] It is appreciated that a function of VGR3986 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3986 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3986 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3986 gene: VGAM18 host target protein, VGAM23 host target protein, VGAM28 host target protein, VGAM99 host target protein, VGAM105 host target protein, VGAM106 host target protein, VGAM107 host target protein and VGAM110 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM18, VGAM23, VGAM28, VGAM99, VGAM105, VGAM106, VGAM107 and VGAM110

[55634] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3987(VGR3987) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55635] VGR3987 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3987 gene was detected is described hereinabove with reference to Figs. 6–15.

[55636] VGR3987 gene encodes VGR3987 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55637] VGR3987 precursor RNA folds spatially, forming VGR3987 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3987 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3987 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55638] VGR3987 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM111 precursor RNA, VGAM218 precursor RNA, VGAM219 precursor RNA, VGAM267 precursor RNA, VGAM268 precursor RNA, VGAM269 precursor RNA,

VGAM270 precursor RNA and VGAM271 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55639] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM111 RNA, VGAM218 RNA, VGAM219 RNA, VGAM267 RNA, VGAM268 RNA, VGAM269 RNA, VGAM270 RNA and VGAM271 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55640] VGAM111 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM111 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM111 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM111 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55641] VGAM218 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM218 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM218 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM218 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55642] VGAM219 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM219 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM219 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM219 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55643] VGAM267 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM267 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM267 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM267 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55644] VGAM268 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM268 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM268 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM268 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55645] VGAM269 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM269 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM269 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM269 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55646] VGAM270 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM270 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM270 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM270 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55647] VGAM271 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM271 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM271 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM271 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55648] It is appreciated that a function of VGR3987 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3987 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3987 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3987 gene: VGAM111 host target protein, VGAM218 host target protein, VGAM219 host target protein, VGAM267 host target protein, VGAM268 host target protein, VGAM269 host target protein, VGAM270 host target protein and VGAM271 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM111, VGAM218, VGAM219, VGAM267, VGAM268, VGAM269, VGAM270 and VGAM271

[55649] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3988(VGR3988) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55650] VGR3988 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3988 gene was detected is described hereinabove with reference to Figs. 6–15.

[55651] VGR3988 gene encodes VGR3988 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55652] VGR3988 precursor RNA folds spatially, forming VGR3988 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3988 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3988 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55653] VGR3988 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM275 precursor RNA, VGAM276 precursor RNA, VGAM278 precursor RNA, VGAM279 precursor RNA, VGAM280 precursor RNA, VGAM282 precursor RNA, VGAM283 precursor RNA and VGAM285 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55654] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM275 RNA, VGAM276 RNA, VGAM278 RNA, VGAM279 RNA, VGAM280 RNA, VGAM282 RNA, VGAM283 RNA and VGAM285 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[55655] VGAM275 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM275 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM275 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM275 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55656] VGAM276 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM276 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM276 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM276 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55657] VGAM278 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM278 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM278 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM278 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55658] VGAM279 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM279 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM279 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM279 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55659] VGAM280 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM280 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM280 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM280 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55660] VGAM282 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM282 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM282 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM282 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55661] VGAM283 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM283 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM283 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM283 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55662] VGAM285 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM285 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM285 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM285 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55663] It is appreciated that a function of VGR3988 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3988 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3988 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3988 gene: VGAM275 host target protein, VGAM276 host target protein, VGAM278 host target protein, VGAM279 host target protein, VGAM280 host target protein, VGAM282 host target protein, VGAM283 host target protein and VGAM285 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to

VGAM275, VGAM276, VGAM278, VGAM279, VGAM280, VGAM282, VGAM283 and VGAM285

[55664] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3989(VGR3989) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55665] VGR3989 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3989 gene was detected is described hereinabove with reference to Figs. 6–15.

[55666] VGR3989 gene encodes VGR3989 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55667] VGR3989 precursor RNA folds spatially, forming VGR3989 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3989 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3989 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55668] VGR3989 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM286 precursor RNA, VGAM288 precursor RNA, VGAM292 precursor RNA, VGAM294 precursor RNA, VGAM297 precursor RNA, VGAM299 precursor RNA, VGAM301 precursor RNA and VGAM302 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55669] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM286

RNA, VGAM288 RNA, VGAM292 RNA, VGAM294 RNA, VGAM297 RNA, VGAM299 RNA, VGAM301 RNA and VGAM302 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55670] VGAM286 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM286 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM286 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM286 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55671] VGAM288 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM288 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM288 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM288 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55672] VGAM292 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM292 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM292 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM292 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55673] VGAM294 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM294 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM294 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM294 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55674] VGAM297 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM297 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM297 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM297 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55675] VGAM299 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM299 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM299 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM299 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55676] VGAM301 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM301 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM301 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM301 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55677] VGAM302 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM302 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM302 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM302 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55678] It is appreciated that a function of VGR3989 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3989 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3989 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3989 gene: VGAM286 host target protein, VGAM288 host target protein, VGAM292 host target protein, VGAM294 host target protein,

VGAM297 host target protein, VGAM299 host target protein, VGAM301 host target protein and VGAM302 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM286, VGAM288, VGAM292, VGAM294, VGAM297, VGAM299, VGAM301 and VGAM302

[55679] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3990(VGR3990) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55680] VGR3990 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3990 gene was detected is described hereinabove with reference to Figs. 6-15.

[55681] VGR3990 gene encodes VGR3990 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[55682] VGR3990 precursor RNA folds spatially, forming VGR3990 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3990 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3990 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55683] VGR3990 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM303 precursor RNA, VGAM304 precursor RNA, VGAM305 precursor RNA, VGAM306 precursor RNA, VGAM309 precursor RNA, VGAM311 precursor RNA, VGAM332 precursor RNA and VGAM337 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively,

each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55684] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM303 RNA, VGAM304 RNA, VGAM305 RNA, VGAM306 RNA, VGAM309 RNA, VGAM311 RNA, VGAM332 RNA and VGAM337 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55685] VGAM303 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM303 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM303 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM303 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55686] VGAM304 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM304 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM304 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM304 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55687] VGAM305 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM305 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM305 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM305 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55688] VGAM306 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM306 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM306 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM306 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55689] VGAM309 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM309 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM309 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM309 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55690] VGAM311 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM311 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM311 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM311 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55691] VGAM332 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM332 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM332 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM332 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55692] VGAM337 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM337 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM337 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM337 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55693] It is appreciated that a function of VGR3990 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3990 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3990

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3990 gene: VGAM303 host target protein, VGAM304 host target protein, VGAM305 host target protein, VGAM306 host target protein, VGAM309 host target protein, VGAM311 host target protein, VGAM332 host target protein and VGAM337 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM303, VGAM304, VGAM305, VGAM306, VGAM309, VGAM311, VGAM332 and VGAM337

[55694] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3991(VGR3991) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55695] VGR3991 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3991 gene was detected is described hereinabove with reference to Figs. 6–15.

[55696] VGR3991 gene encodes VGR3991 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55697] VGR3991 precursor RNA folds spatially, forming VGR3991 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3991 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3991 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55698] VGR3991 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM357 precursor RNA, VGAM361 precursor RNA, VGAM362 precursor RNA, VGAM363 precursor

RNA, VGAM423 precursor RNA, VGAM424 precursor RNA, VGAM425 precursor RNA and VGAM430 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55699] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM357 RNA, VGAM361 RNA, VGAM362 RNA, VGAM363 RNA, VGAM423 RNA, VGAM424 RNA, VGAM425 RNA and VGAM430 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55700] VGAM357 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM357 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM357 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM357 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55701] VGAM361 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM361 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM361 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM361 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55702] VGAM362 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM362 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM362 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM362 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55703] VGAM363 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM363 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM363 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM363 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55704] VGAM423 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM423 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM423 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM423 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55705] VGAM424 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM424 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM424 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM424 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55706] VGAM425 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM425 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM425 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM425 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55707] VGAM430 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM430 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM430 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM430 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55708] It is appreciated that a function of VGR3991 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3991 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3991 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3991 gene: VGAM357 host target protein, VGAM361 host target protein, VGAM362 host target protein, VGAM363 host target protein, VGAM423 host target protein, VGAM424 host target protein, VGAM425 host target protein and VGAM430 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM357, VGAM361, VGAM362, VGAM363, VGAM423, VGAM424, VGAM425 and VGAM430

[55709] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3992(VGR3992) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55710] VGR3992 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3992 gene was detected is described hereinabove with reference to Figs. 6–15.

[55711] VGR3992 gene encodes VGR3992 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55712] VGR3992 precursor RNA folds spatially, forming VGR3992 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3992 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3992 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[55713] VGR3992 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM431 precursor RNA, VGAM432 precursor RNA, VGAM433 precursor RNA, VGAM563 precursor RNA, VGAM566 precursor RNA, VGAM567 precursor RNA, VGAM710 precursor RNA and VGAM720 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55714] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM431 RNA, VGAM432 RNA, VGAM433 RNA, VGAM563 RNA, VGAM566 RNA, VGAM567 RNA, VGAM710 RNA and VGAM720 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55715] VGAM431 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM431 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM431 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM431 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55716] VGAM432 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM432 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM432 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM432 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55717] VGAM433 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM433 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM433 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM433 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55718] VGAM563 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM563 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM563 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM563 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55719] VGAM566 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM566 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM566 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM566 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55720] VGAM567 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM567 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM567 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM567 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55721] VGAM710 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM710 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM710 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM710 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55722] VGAM720 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM720 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM720 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM720 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55723] It is appreciated that a function of VGR3992 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3992 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3992 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3992 gene: VGAM431 host target protein, VGAM432 host target protein, VGAM433 host target protein, VGAM563 host target protein, VGAM566 host target protein, VGAM567 host target protein, VGAM710 host target protein and VGAM720 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host tar-

get genes is elaborated hereinabove with reference to VGAM431, VGAM432, VGAM433, VGAM563, VGAM566, VGAM567, VGAM710 and VGAM720

[55724] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3993(VGR3993) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55725] VGR3993 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3993 gene was detected is described hereinabove with reference to Figs. 6–15.

[55726] VGR3993 gene encodes VGR3993 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55727] VGR3993 precursor RNA folds spatially, forming VGR3993 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3993 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3993 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55728] VGR3993 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM724 precursor RNA, VGAM725 precursor RNA, VGAM966 precursor RNA, VGAM1082 precursor RNA, VGAM1083 precursor RNA, VGAM1094 precursor RNA, VGAM1096 precursor RNA and VGAM1097 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55729] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM724 RNA, VGAM725 RNA, VGAM966 RNA, VGAM1082 RNA, VGAM1083 RNA, VGAM1094 RNA, VGAM1096 RNA and VGAM1097 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55730] VGAM724 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM724 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM724 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM724 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55731] VGAM725 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM725 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM725 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM725 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55732] VGAM966 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM966 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM966 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM966 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55733] VGAM1082 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM1082 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1082 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1082 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55734] VGAM1083 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1083 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1083 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1083 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55735] VGAM1094 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1094 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1094 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1094 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55736] VGAM1096 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1096 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1096 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1096 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55737] VGAM1097 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1097 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1097 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1097 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55738] It is appreciated that a function of VGR3993 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3993 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3993 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3993 gene: VGAM724 host target protein, VGAM725 host target protein, VGAM966

host target protein, VGAM1082 host target protein, VGAM1083 host target protein, VGAM1094 host target protein, VGAM1096 host target protein and VGAM1097 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM724, VGAM725, VGAM966, VGAM1082, VGAM1083, VGAM1094, VGAM1096 and VGAM1097

[55739] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3994(VGR3994) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55740] VGR3994 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3994 gene was detected is described hereinabove with reference to Figs. 6-15.

[55741] VGR3994 gene encodes VGR3994 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55742] VGR3994 precursor RNA folds spatially, forming VGR3994 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3994 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3994 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55743] VGR3994 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1098 precursor RNA, VGAM1365 precursor RNA, VGAM1562 precursor RNA, VGAM1563 precursor RNA, VGAM1566 precursor RNA, VGAM1870 precursor RNA, VGAM2309 precursor RNA and VGAM2435 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55744] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1098 RNA, VGAM1365 RNA, VGAM1562 RNA, VGAM1563 RNA, VGAM1566 RNA, VGAM1870 RNA, VGAM2309 RNA and VGAM2435 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55745] VGAM1098 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1098 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1098 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM1098 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55746] VGAM1365 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1365 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1365 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1365 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55747] VGAM1562 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1562 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1562 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM1562 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55748] VGAM1563 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1563 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1563 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1563 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55749] VGAM1566 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1566 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1566 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1566 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55750] VGAM1870 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1870 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1870 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1870 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55751] VGAM2309 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2309 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2309 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2309 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55752] VGAM2435 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2435 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2435 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2435 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55753] It is appreciated that a function of VGR3994 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3994 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR3994 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3994 gene: VGAM1098 host target protein, VGAM1365 host target protein, VGAM1562 host target protein, VGAM1563 host target protein, VGAM1566 host target protein, VGAM1870 host target protein, VGAM2309 host target protein and VGAM2435 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1098, VGAM1365, VGAM1562, VGAM1563, VGAM1566, VGAM1870, VGAM2309 and VGAM2435

[55754] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3995(VGR3995) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[55755] VGR3995 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3995 gene was detected is described hereinabove with reference to Figs. 6–15.

[55756] VGR3995 gene encodes VGR3995 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55757] VGR3995 precursor RNA folds spatially, forming VGR3995 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3995 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3995 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55758] VGR3995 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM2460 precursor RNA, VGAM2704 precursor RNA, VGAM2877 precursor RNA, VGAM3049 precursor RNA, VGAM3125 precursor RNA, VGAM3170 precursor RNA, VGAM3283 precursor RNA and VGAM3284 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55759] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2460 RNA, VGAM2704 RNA, VGAM2877 RNA, VGAM3049 RNA, VGAM3125 RNA, VGAM3170 RNA, VGAM3283 RNA and VGAM3284 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55760] VGAM2460 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2460 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2460 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2460 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55761] VGAM2704 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2704 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2704 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2704 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55762] VGAM2877 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2877 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2877 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2877 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55763] VGAM3049 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3049 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3049 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3049 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55764] VGAM3125 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3125 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3125 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3125 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55765] VGAM3170 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3170 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3170 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3170 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[55766] VGAM3283 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3283 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3283 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3283 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55767] VGAM3284 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3284 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3284 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3284 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55768] It is appreciated that a function of VGR3995 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3995 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3995 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3995 gene: VGAM2460 host target protein, VGAM2704 host target protein, VGAM2877 host target protein, VGAM3049 host target protein, VGAM3125 host target protein, VGAM3170 host target protein, VGAM3283 host target protein and VGAM3284 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2460, VGAM2704, VGAM2877, VGAM3049, VGAM3125, VGAM3170, VGAM3283 and VGAM3284

[55769] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3996(VGR3996) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55770] VGR3996 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3996 gene was detected is described hereinabove with reference to Figs. 6-15.

[55771] VGR3996 gene encodes VGR3996 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55772] VGR3996 precursor RNA folds spatially, forming VGR3996 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3996 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3996 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55773] VGR3996 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3532 precursor RNA and VGAM3598 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55774] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3532 RNA and VGAM3598 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55775] VGAM3532 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3532 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3532 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3532 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55776] VGAM3598 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3598 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3598 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3598 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55777] It is appreciated that a function of VGR3996 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3996 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3996 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3996 gene: VGAM3532 host target protein and VGAM3598 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3532 and VGAM3598

[55778] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3997(VGR3997) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55779] VGR3997 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR3997 gene was detected is described hereinabove with reference to Figs. 6–15.

[55780] VGR3997 gene encodes VGR3997 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55781] VGR3997 precursor RNA folds spatially, forming VGR3997 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3997 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3997 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55782] VGR3997 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM534 precursor RNA, VGAM535 precursor RNA, VGAM549 precursor RNA, VGAM550 precursor RNA, VGAM551 precursor RNA, VGAM704 precursor RNA,

VGAM1114 precursor RNA and VGAM1120 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55783] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM534 RNA, VGAM535 RNA, VGAM549 RNA, VGAM550 RNA, VGAM551 RNA, VGAM704 RNA, VGAM1114 RNA and VGAM1120 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55784] VGAM534 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM534 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM534 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM534 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55785] VGAM535 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM535 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM535 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM535 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55786] VGAM549 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM549 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM549 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM549 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55787] VGAM550 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM550 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM550 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM550 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55788] VGAM551 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM551 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM551 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM551 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55789] VGAM704 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM704 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM704 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM704 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55790] VGAM1114 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM1114 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1114 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1114 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55791] VGAM1120 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1120 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1120 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1120 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55792] It is appreciated that a function of VGR3997 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3997 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3997 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3997 gene: VGAM534 host target protein, VGAM535 host target protein, VGAM549 host target protein, VGAM550 host target protein, VGAM551 host target protein, VGAM704 host target protein, VGAM1114 host target protein and VGAM1120 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM534, VGAM535, VGAM549, VGAM550, VGAM551, VGAM704, VGAM1114 and VGAM1120

[55793] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3998(VGR3998) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55794] VGR3998 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3998 gene was detected is described hereinabove with reference to Figs. 6–15.

[55795] VGR3998 gene encodes VGR3998 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55796] VGR3998 precursor RNA folds spatially, forming VGR3998 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3998 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3998 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55797] VGR3998 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1252 precursor RNA, VGAM1605 precursor RNA, VGAM1858 precursor RNA, VGAM1863 precursor RNA, VGAM1865 precursor RNA, VGAM1911 precursor RNA, VGAM1917 precursor RNA and VGAM1919 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55798] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1252 RNA, VGAM1605 RNA, VGAM1858 RNA, VGAM1863 RNA, VGAM1865 RNA, VGAM1911 RNA, VGAM1917 RNA and VGAM1919 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[55799] VGAM1252 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1252 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1252 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1252 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55800] VGAM1605 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1605 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1605 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1605 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55801] VGAM1858 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1858 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1858 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1858 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55802] VGAM1863 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1863 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1863 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM1863 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55803] VGAM1865 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1865 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1865 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1865 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55804] VGAM1911 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1911 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1911 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1911 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55805] VGAM1917 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1917 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1917 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1917 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55806] VGAM1919 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1919 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1919 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1919 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55807] It is appreciated that a function of VGR3998 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3998 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3998 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3998 gene: VGAM1252 host target protein, VGAM1605 host target protein, VGAM1858 host target protein, VGAM1863 host target protein, VGAM1865 host target protein, VGAM1911 host target protein, VGAM1917 host target protein and VGAM1919 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM1252, VGAM1605, VGAM1858, VGAM1863, VGAM1865, VGAM1911, VGAM1917 and VGAM1919

[55808] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 3999(VGR3999) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55809] VGR3999 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR3999 gene was detected is described hereinabove with reference to Figs. 6–15.

[55810] VGR3999 gene encodes VGR3999 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55811] VGR3999 precursor RNA folds spatially, forming VGR3999 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR3999 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR3999 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55812] VGR3999 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1926 precursor RNA, VGAM1927 precursor RNA, VGAM1928 precursor RNA, VGAM2307 precursor RNA, VGAM2308 precursor RNA, VGAM2465 precursor RNA, VGAM2506 precursor RNA and VGAM2581 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55813] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1926 RNA, VGAM1927 RNA, VGAM1928 RNA, VGAM2307 RNA, VGAM2308 RNA, VGAM2465 RNA, VGAM2506 RNA and VGAM2581 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55814] VGAM1926 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1926 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1926 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1926 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55815] VGAM1927 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1927 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1927 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1927 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55816] VGAM1928 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1928 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1928 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1928 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55817] VGAM2307 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM2307 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2307 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2307 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55818] VGAM2308 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2308 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2308 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2308 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55819] VGAM2465 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2465 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2465 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2465 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55820] VGAM2506 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2506 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2506 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2506 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55821] VGAM2581 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2581 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2581 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2581 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55822] It is appreciated that a function of VGR3999 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR3999 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR3999 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR3999 gene: VGAM1926 host target protein, VGAM1927 host target protein,

VGAM1928 host target protein, VGAM2307 host target protein, VGAM2308 host target protein, VGAM2465 host target protein, VGAM2506 host target protein and VGAM2581 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1926, VGAM1927, VGAM1928, VGAM2307, VGAM2308, VGAM2465, VGAM2506 and VGAM2581

[55823] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4000(VGR4000) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55824] VGR4000 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4000 gene was detected is described hereinabove with reference to Figs. 6-15.

- [55825] VGR4000 gene encodes VGR4000 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.
- [55826] VGR4000 precursor RNA folds spatially, forming VGR4000 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4000 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4000 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.
- [55827] VGR4000 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2582 precursor RNA, VGAM2644 precursor RNA, VGAM2829 precursor RNA, VGAM2974 precursor RNA, VGAM3046 precursor RNA, VGAM3354 precursor RNA, VGAM3424 precursor RNA and VGAM3433 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55828] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2582 RNA, VGAM2644 RNA, VGAM2829 RNA, VGAM2974 RNA, VGAM3046 RNA, VGAM3354 RNA, VGAM3424 RNA and VGAM3433 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55829] VGAM2582 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2582 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2582 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2582 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55830] VGAM2644 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2644 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2644 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2644 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55831] VGAM2829 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2829 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2829 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2829 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55832] VGAM2974 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2974 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2974 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2974 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55833] VGAM3046 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3046 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3046 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3046 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55834] VGAM3354 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3354 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3354 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3354 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55835] VGAM3424 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3424 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3424 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3424 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55836] VGAM3433 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3433 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3433 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3433 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55837] It is appreciated that a function of VGR4000 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4000 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4000 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4000 gene: VGAM2582 host target protein, VGAM2644 host target protein, VGAM2829 host target protein, VGAM2974 host target protein, VGAM3046 host target protein, VGAM3354 host target protein, VGAM3424 host target protein and VGAM3433 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2582, VGAM2644, VGAM2829, VGAM2974, VGAM3046, VGAM3354, VGAM3424 and VGAM3433

[55838] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4001(VGR4001) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[55839] VGR4001 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4001 gene was detected is described hereinabove with reference to Figs. 6–15.

[55840] VGR4001 gene encodes VGR4001 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55841] VGR4001 precursor RNA folds spatially, forming VGR4001 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4001 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4001 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55842] VGR4001 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM3443 precursor RNA, VGAM3608 precursor RNA, VGAM3678 precursor RNA, VGAM3739 precursor RNA, VGAM3760 precursor RNA, VGAM3806 precursor RNA and VGAM3825 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55843] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3443 RNA, VGAM3608 RNA, VGAM3678 RNA, VGAM3739 RNA, VGAM3760 RNA, VGAM3806 RNA and VGAM3825 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55844] VGAM3443 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3443 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3443 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3443 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55845] VGAM3608 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3608 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3608 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3608 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55846] VGAM3678 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM3678 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3678 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3678 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55847] VGAM3739 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3739 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3739 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3739 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55848] VGAM3760 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3760 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3760 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3760 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55849] VGAM3806 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3806 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3806 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3806 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55850] VGAM3825 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3825 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3825 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3825 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55851] It is appreciated that a function of VGR4001 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4001 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4001 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4001 gene: VGAM3443 host target protein, VGAM3608 host target protein,

VGAM3678 host target protein, VGAM3739 host target protein, VGAM3760 host target protein, VGAM3806 host target protein and VGAM3825 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3443, VGAM3608, VGAM3678, VGAM3739, VGAM3760, VGAM3806 and VGAM3825

[55852] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4002(VGR4002) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55853] VGR4002 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4002 gene was detected is described hereinabove with reference to Figs. 6-15.

[55854] VGR4002 gene encodes VGR4002 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55855] VGR4002 precursor RNA folds spatially, forming VGR4002 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4002 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4002 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55856] VGR4002 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1492 precursor RNA, VGAM1493 precursor RNA, VGAM1494 precursor RNA, VGAM1495 precursor RNA, VGAM2572 precursor RNA, VGAM2573 precursor RNA and VGAM2867 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRE-

CURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55857] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1492 RNA, VGAM1493 RNA, VGAM1494 RNA, VGAM1495 RNA, VGAM2572 RNA, VGAM2573 RNA and VGAM2867 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55858] VGAM1492 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1492 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1492 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1492 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[55859] VGAM1493 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1493 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1493 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1493 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55860] VGAM1494 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1494 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1494 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1494 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55861] VGAM1495 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1495 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1495 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1495 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55862] VGAM2572 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2572 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2572 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM2572 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55863] VGAM2573 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2573 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2573 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2573 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55864] VGAM2867 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2867 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2867 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM2867 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55865] It is appreciated that a function of VGR4002 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4002 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4002 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4002 gene: VGAM1492 host target protein, VGAM1493 host target protein, VGAM1494 host target protein, VGAM1495 host target protein, VGAM2572 host target protein, VGAM2573 host target protein and VGAM2867 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1492, VGAM1493, VGAM1494, VGAM1495, VGAM2572, VGAM2573 and

VGAM2867

[55866] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4003(VGR4003) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55867] VGR4003 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4003 gene was detected is described hereinabove with reference to Figs. 6–15.

[55868] VGR4003 gene encodes VGR4003 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55869] VGR4003 precursor RNA folds spatially, forming VGR4003 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4003 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4003 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55870] VGR4003 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM764 precursor RNA, VGAM765 precursor RNA and VGAM3668 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55871] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM764 RNA, VGAM765 RNA and VGAM3668 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55872] VGAM764 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM764 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM764 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM764 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55873] VGAM765 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM765 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM765 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM765 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55874] VGAM3668 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3668 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3668 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3668 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55875] It is appreciated that a function of VGR4003 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4003 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4003 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4003 gene: VGAM764 host target protein, VGAM765 host target protein and VGAM3668 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM764, VGAM765 and VGAM3668

[55876] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4004(VGR4004) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55877] VGR4004 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4004 gene was detected is described hereinabove with reference to Figs. 6–15.

[55878] VGR4004 gene encodes VGR4004 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55879] VGR4004 precursor RNA folds spatially, forming VGR4004 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4004 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4004 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55880] VGR4004 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1859 precursor RNA, VGAM1860 precursor RNA, VGAM1861 precursor RNA and VGAM1862 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55881] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1859 RNA, VGAM1860 RNA, VGAM1861 RNA and VGAM1862

RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55882] VGAM1859 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1859 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1859 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1859 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55883] VGAM1860 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1860 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1860 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1860 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55884] VGAM1861 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1861 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1861 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1861 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55885] VGAM1862 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1862 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1862 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1862 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55886] It is appreciated that a function of VGR4004 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4004 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4004 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4004 gene: VGAM1859 host target protein, VGAM1860 host target protein, VGAM1861 host target protein and VGAM1862 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1859, VGAM1860, VGAM1861 and VGAM1862

[55887] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4005(VGR4005) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55888] VGR4005 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4005 gene was detected is described hereinabove with reference to Figs. 6–15.

[55889] VGR4005 gene encodes VGR4005 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55890] VGR4005 precursor RNA folds spatially, forming VGR4005 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4005 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4005 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55891] VGR4005 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM519 precursor RNA, VGAM520 precursor RNA, VGAM521 precursor RNA, VGAM522 precursor RNA and VGAM523 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55892] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM519 RNA, VGAM520 RNA, VGAM521 RNA, VGAM522 RNA and VGAM523 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55893] VGAM519 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM519 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM519 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM519 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55894] VGAM520 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM520 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM520 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM520 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[55895] VGAM521 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM521 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM521 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM521 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55896] VGAM522 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM522 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM522 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM522 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55897] VGAM523 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM523 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM523 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM523 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55898] It is appreciated that a function of VGR4005 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4005 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4005 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4005 gene: VGAM519 host target protein, VGAM520 host target protein, VGAM521 host target protein, VGAM522 host target protein and VGAM523 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM519, VGAM520, VGAM521, VGAM522 and VGAM523

[55899] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4006(VGR4006) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55900] VGR4006 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4006 gene was detected is described hereinabove with reference to Figs. 6-15.

[55901] VGR4006 gene encodes VGR4006 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55902] VGR4006 precursor RNA folds spatially, forming VGR4006 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4006 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4006 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55903] VGR4006 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM504 precursor RNA, VGAM509 precursor RNA, VGAM797 precursor RNA, VGAM798 precursor RNA, VGAM800 precursor RNA, VGAM801 precursor RNA, VGAM802 precursor RNA and VGAM803 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR,

VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55904] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM504 RNA, VGAM509 RNA, VGAM797 RNA, VGAM798 RNA, VGAM800 RNA, VGAM801 RNA, VGAM802 RNA and VGAM803 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55905] VGAM504 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM504 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM504 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM504 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55906] VGAM509 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM509 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM509 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM509 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55907] VGAM797 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM797 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM797 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM797 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55908] VGAM798 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM798 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM798 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM798 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55909] VGAM800 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM800 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM800 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM800 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55910] VGAM801 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM801 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM801 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM801 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55911] VGAM802 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM802 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM802 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM802 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55912] VGAM803 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM803 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM803 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM803 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55913] It is appreciated that a function of VGR4006 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4006 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4006 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4006 gene: VGAM504 host target protein, VGAM509 host target protein, VGAM797 host target protein, VGAM798 host target protein, VGAM800 host target protein, VGAM801 host target protein, VGAM802 host target protein and VGAM803 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM504, VGAM509, VGAM797, VGAM798, VGAM800, VGAM801, VGAM802 and VGAM803

[55914] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4007(VGR4007) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55915] VGR4007 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4007 gene was detected is described hereinabove with reference to Figs. 6–15.

[55916] VGR4007 gene encodes VGR4007 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55917] VGR4007 precursor RNA folds spatially, forming VGR4007 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4007 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4007 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55918] VGR4007 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM804 precursor RNA, VGAM805 precursor

sor RNA and VGAM922 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55919] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM804 RNA, VGAM805 RNA and VGAM922 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55920] VGAM804 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM804 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM804 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM804 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[55921] VGAM805 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM805 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM805 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM805 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55922] VGAM922 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM922 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM922 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM922 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55923] It is appreciated that a function of VGR4007 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4007 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4007 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4007 gene: VGAM804 host target protein, VGAM805 host target protein and VGAM922 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM804, VGAM805 and VGAM922

[55924] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4008(VGR4008) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55925] VGR4008 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4008 gene was detected is described hereinabove with reference to Figs. 6–15.

[55926] VGR4008 gene encodes VGR4008 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55927] VGR4008 precursor RNA folds spatially, forming VGR4008 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4008 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4008 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55928] VGR4008 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2374 precursor RNA, VGAM3278 precursor RNA and VGAM3279 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55929] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2374 RNA, VGAM3278 RNA and VGAM3279 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55930] VGAM2374 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2374 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2374 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2374 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55931] VGAM3278 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3278 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3278 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3278 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55932] VGAM3279 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3279 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3279 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3279 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55933] It is appreciated that a function of VGR4008 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4008 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4008 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4008 gene: VGAM2374 host target protein, VGAM3278 host target protein and VGAM3279 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2374, VGAM3278 and VGAM3279

[55934] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4009(VGR4009) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55935] VGR4009 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4009 gene was detected is described hereinabove with reference to Figs. 6–15.

[55936] VGR4009 gene encodes VGR4009 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55937] VGR4009 precursor RNA folds spatially, forming VGR4009 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4009 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4009 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55938] VGR4009 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2293 precursor RNA and VGAM2295 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55939] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2293 RNA and VGAM2295 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55940] VGAM2293 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2293 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2293 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2293 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55941] VGAM2295 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2295 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2295 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2295 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55942] It is appreciated that a function of VGR4009 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4009 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4009 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4009 gene: VGAM2293 host target protein and VGAM2295 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2293 and VGAM2295

[55943] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4010(VGR4010) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55944] VGR4010 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4010 gene was

detected is described hereinabove with reference to Figs. 6–15.

[55945] VGR4010 gene encodes VGR4010 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55946] VGR4010 precursor RNA folds spatially, forming VGR4010 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4010 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4010 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55947] VGR4010 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM587 precursor RNA, VGAM589 precursor RNA, VGAM590 precursor RNA, VGAM1066 precursor RNA, VGAM1253 precursor RNA, VGAM1277 precursor RNA, VGAM1279 precursor RNA and VGAM1280 precursor

RNA, herein schematically represented by VGAM1 PRE-CURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRE-CURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55948] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM587 RNA, VGAM589 RNA, VGAM590 RNA, VGAM1066 RNA, VGAM1253 RNA, VGAM1277 RNA, VGAM1279 RNA and VGAM1280 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55949] VGAM587 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM587 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM587 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM587 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55950] VGAM589 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM589 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM589 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM589 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55951] VGAM590 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM590 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM590 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM590 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55952] VGAM1066 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1066 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1066 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1066 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55953] VGAM1253 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1253 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1253 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1253 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55954] VGAM1277 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1277 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1277 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1277 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55955] VGAM1279 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1279 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1279 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1279 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55956] VGAM1280 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1280 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1280 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1280 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55957] It is appreciated that a function of VGR4010 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4010 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4010 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4010 gene: VGAM587 host target protein, VGAM589 host target protein, VGAM590 host target protein, VGAM1066 host target protein, VGAM1253 host target protein, VGAM1277 host target protein, VGAM1279 host target protein and VGAM1280 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM587, VGAM589, VGAM590, VGAM1066, VGAM1253, VGAM1277, VGAM1279 and VGAM1280

[55958] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4011(VGR4011) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55959] VGR4011 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4011 gene was detected is described hereinabove with reference to Figs. 6–15.

[55960] VGR4011 gene encodes VGR4011 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55961] VGR4011 precursor RNA folds spatially, forming VGR4011 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4011 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4011 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55962] VGR4011 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM2187 precursor RNA, VGAM2189 precursor RNA, VGAM2687 precursor RNA, VGAM2692 precursor RNA, VGAM2734 precursor RNA, VGAM3085 precursor RNA and VGAM3553 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55963] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2187 RNA, VGAM2189 RNA, VGAM2687 RNA, VGAM2692 RNA, VGAM2734 RNA, VGAM3085 RNA and VGAM3553 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55964] VGAM2187 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2187 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2187 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2187 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55965] VGAM2189 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2189 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2189 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2189 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55966] VGAM2687 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2687 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2687 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2687 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55967] VGAM2692 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2692 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2692 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2692 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55968] VGAM2734 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2734 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2734 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2734 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55969] VGAM3085 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3085 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3085 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3085 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[55970] VGAM3553 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3553 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3553 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3553 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55971] It is appreciated that a function of VGR4011 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4011 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4011 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4011 gene: VGAM2187

host target protein, VGAM2189 host target protein, VGAM2687 host target protein, VGAM2692 host target protein, VGAM2734 host target protein, VGAM3085 host target protein and VGAM3553 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2187, VGAM2189, VGAM2687, VGAM2692, VGAM2734, VGAM3085 and VGAM3553

[55972] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4012(VGR4012) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[55973] VGR4012 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4012 gene was detected is described hereinabove with reference to Figs. 6-15.

[55974] VGR4012 gene encodes VGR4012 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55975] VGR4012 precursor RNA folds spatially, forming VGR4012 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4012 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4012 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[55976] VGR4012 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM771 precursor RNA, VGAM889 precursor RNA, VGAM890 precursor RNA, VGAM998 precursor RNA, VGAM999 precursor RNA, VGAM1000 precursor RNA, VGAM1873 precursor RNA and VGAM1875 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR,

VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55977] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM771 RNA, VGAM889 RNA, VGAM890 RNA, VGAM998 RNA, VGAM999 RNA, VGAM1000 RNA, VGAM1873 RNA and VGAM1875 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55978] VGAM771 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM771 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM771 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM771 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55979] VGAM889 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM889 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM889 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM889 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55980] VGAM890 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM890 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM890 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM890 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55981] VGAM998 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM998 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM998 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM998 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55982] VGAM999 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM999 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM999 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM999 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55983] VGAM1000 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1000 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1000 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1000 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[55984] VGAM1873 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1873 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1873 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1873 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[55985] VGAM1875 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1875 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1875 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1875 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[55986] It is appreciated that a function of VGR4012 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4012 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4012 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4012 gene: VGAM771 host target protein, VGAM889 host target protein, VGAM890 host target protein, VGAM998 host target protein, VGAM999 host target protein, VGAM1000 host target protein, VGAM1873 host target protein and VGAM1875 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM771, VGAM889, VGAM890, VGAM998, VGAM999, VGAM1000, VGAM1873 and VGAM1875

[55987] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4013(VGR4013) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[55988] VGR4013 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4013 gene was detected is described hereinabove with reference to Figs. 6–15.

[55989] VGR4013 gene encodes VGR4013 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[55990] VGR4013 precursor RNA folds spatially, forming VGR4013 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4013 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4013 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[55991] VGR4013 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM1877 precursor RNA, VGAM1879 precursor RNA, VGAM1880 precursor RNA, VGAM1881 precursor RNA, VGAM2402 precursor RNA, VGAM2596 precursor RNA, VGAM2623 precursor RNA and VGAM3222 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[55992] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1877 RNA, VGAM1879 RNA, VGAM1880 RNA, VGAM1881 RNA, VGAM2402 RNA, VGAM2596 RNA, VGAM2623 RNA and VGAM3222 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[55993] VGAM1877 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM1877 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1877 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1877 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[55994] VGAM1879 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1879 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1879 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1879 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[55995] VGAM1880 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1880 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1880 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1880 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[55996] VGAM1881 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1881 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1881 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1881 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[55997] VGAM2402 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2402 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2402 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2402 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[55998] VGAM2596 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2596 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2596 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2596 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[55999] VGAM2623 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2623 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2623 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2623 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56000] VGAM3222 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3222 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3222 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3222 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56001] It is appreciated that a function of VGR4013 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4013 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4013 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4013 gene: VGAM1877 host target protein, VGAM1879 host target protein, VGAM1880 host target protein, VGAM1881 host target protein, VGAM2402 host target protein, VGAM2596 host target protein, VGAM2623 host target protein and VGAM3222 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1877, VGAM1879, VGAM1880, VGAM1881, VGAM2402, VGAM2596, VGAM2623 and VGAM3222

[56002] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4014(VGR4014) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56003] VGR4014 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4014 gene was detected is described hereinabove with reference to Figs. 6–15.

[56004] VGR4014 gene encodes VGR4014 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56005] VGR4014 precursor RNA folds spatially, forming VGR4014 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4014 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4014 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56006] VGR4014 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM3223 precursor RNA, VGAM3500 precursor RNA, VGAM3721 precursor RNA, VGAM3740 precursor RNA, VGAM3748 precursor RNA and VGAM3782 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56007] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3223 RNA, VGAM3500 RNA, VGAM3721 RNA, VGAM3740 RNA, VGAM3748 RNA and VGAM3782 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA

respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56008] VGAM3223 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3223 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3223 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3223 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56009] VGAM3500 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3500 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3500 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM3500 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56010] VGAM3721 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3721 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3721 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3721 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56011] VGAM3740 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3740 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3740 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM3740 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56012] VGAM3748 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3748 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3748 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3748 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56013] VGAM3782 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3782 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3782 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3782 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56014] It is appreciated that a function of VGR4014 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4014 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4014 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4014 gene: VGAM3223 host target protein, VGAM3500 host target protein, VGAM3721 host target protein, VGAM3740 host target protein, VGAM3748 host target protein and VGAM3782 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3223, VGAM3500, VGAM3721, VGAM3740,

VGAM3748 and VGAM3782

[56015] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4015(VGR4015) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56016] VGR4015 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4015 gene was detected is described hereinabove with reference to Figs. 6–15.

[56017] VGR4015 gene encodes VGR4015 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56018] VGR4015 precursor RNA folds spatially, forming VGR4015 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4015 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4015 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56019] VGR4015 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM67 precursor RNA, VGAM453 precursor RNA, VGAM454 precursor RNA, VGAM458 precursor RNA, VGAM475 precursor RNA, VGAM477 precursor RNA, VGAM478 precursor RNA and VGAM479 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56020] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM67 RNA, VGAM453 RNA, VGAM454 RNA, VGAM458 RNA,

VGAM475 RNA, VGAM477 RNA, VGAM478 RNA and VGAM479 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56021] VGAM67 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM67 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM67 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM67 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56022] VGAM453 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM453 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM453 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM453 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56023] VGAM454 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM454 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM454 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM454 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56024] VGAM458 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM458 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM458 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM458 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56025] VGAM475 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM475 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM475 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM475 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56026] VGAM477 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM477 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM477 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM477 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56027] VGAM478 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM478 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM478 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM478 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56028] VGAM479 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM479 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM479 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM479 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56029] It is appreciated that a function of VGR4015 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4015 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4015 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4015 gene: VGAM67 host target protein, VGAM453 host target protein, VGAM454 host target protein, VGAM458 host target protein, VGAM475 host target protein, VGAM477 host target pro-

tein, VGAM478 host target protein and VGAM479 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM67, VGAM453, VGAM454, VGAM458, VGAM475, VGAM477, VGAM478 and VGAM479

[56030] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4016(VGR4016) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56031] VGR4016 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4016 gene was detected is described hereinabove with reference to Figs. 6-15.

[56032] VGR4016 gene encodes VGR4016 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56033] VGR4016 precursor RNA folds spatially, forming VGR4016 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4016 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4016 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56034] VGR4016 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM480 precursor RNA, VGAM481 precursor RNA, VGAM482 precursor RNA, VGAM483 precursor RNA, VGAM492 precursor RNA, VGAM493 precursor RNA, VGAM558 precursor RNA and VGAM561 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56035] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM480 RNA, VGAM481 RNA, VGAM482 RNA, VGAM483 RNA, VGAM492 RNA, VGAM493 RNA, VGAM558 RNA and VGAM561 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56036] VGAM480 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM480 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM480 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM480 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[56037] VGAM481 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM481 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM481 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM481 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56038] VGAM482 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM482 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM482 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM482 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56039] VGAM483 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM483 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM483 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM483 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56040] VGAM492 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM492 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM492 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM492 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56041] VGAM493 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM493 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM493 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM493 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56042] VGAM558 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM558 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM558 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM558 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56043] VGAM561 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM561 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM561 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM561 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56044] It is appreciated that a function of VGR4016 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4016 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4016 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4016 gene: VGAM480 host target protein, VGAM481 host target protein, VGAM482 host target protein, VGAM483 host target protein, VGAM492 host target protein, VGAM493 host target protein, VGAM558 host target protein and VGAM561 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM480, VGAM481, VGAM482, VGAM483, VGAM492, VGAM493, VGAM558 and VGAM561

[56045] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4017(VGR4017) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56046] VGR4017 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4017 gene was detected is described hereinabove with reference to Figs. 6–15.

[56047] VGR4017 gene encodes VGR4017 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56048] VGR4017 precursor RNA folds spatially, forming VGR4017 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4017 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4017 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56049] VGR4017 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM610 precursor RNA, VGAM626 precursor RNA, VGAM627 precursor RNA, VGAM733 precursor RNA, VGAM792 precursor RNA, VGAM794 precursor RNA,

VGAM892 precursor RNA and VGAM893 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56050] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM610 RNA, VGAM626 RNA, VGAM627 RNA, VGAM733 RNA, VGAM792 RNA, VGAM794 RNA, VGAM892 RNA and VGAM893 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56051] VGAM610 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM610 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM610 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM610 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56052] VGAM626 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM626 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM626 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM626 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56053] VGAM627 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM627 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM627 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM627 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56054] VGAM733 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM733 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM733 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM733 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56055] VGAM792 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM792 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM792 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM792 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56056] VGAM794 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM794 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM794 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM794 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56057] VGAM892 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM892 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM892 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM892 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56058] VGAM893 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM893 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM893 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM893 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56059] It is appreciated that a function of VGR4017 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4017 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4017 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4017 gene: VGAM610 host target protein, VGAM626 host target protein, VGAM627 host target protein, VGAM733 host target protein, VGAM792 host target protein, VGAM794 host target protein, VGAM892 host target protein and VGAM893 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM610, VGAM626, VGAM627, VGAM733, VGAM792, VGAM794, VGAM892 and VGAM893

[56060] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4018(VGR4018) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56061] VGR4018 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4018 gene was detected is described hereinabove with reference to Figs. 6–15.

[56062] VGR4018 gene encodes VGR4018 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56063] VGR4018 precursor RNA folds spatially, forming VGR4018 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4018 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4018 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56064] VGR4018 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM900 precursor RNA, VGAM902 precursor RNA, VGAM903 precursor RNA, VGAM950 precursor RNA, VGAM951 precursor RNA, VGAM952 precursor RNA, VGAM1187 precursor RNA and VGAM1188 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56065] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM900 RNA, VGAM902 RNA, VGAM903 RNA, VGAM950 RNA, VGAM951 RNA, VGAM952 RNA, VGAM1187 RNA and VGAM1188 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[56066] VGAM900 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM900 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM900 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM900 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56067] VGAM902 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM902 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM902 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM902 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56068] VGAM903 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM903 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM903 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM903 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56069] VGAM950 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM950 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM950 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM950 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56070] VGAM951 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM951 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM951 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM951 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56071] VGAM952 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM952 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM952 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM952 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56072] VGAM1187 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1187 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1187 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1187 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56073] VGAM1188 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1188 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1188 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1188 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56074] It is appreciated that a function of VGR4018 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4018 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4018 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4018 gene: VGAM900 host target protein, VGAM902 host target protein, VGAM903 host target protein, VGAM950 host target protein, VGAM951 host target protein, VGAM952 host target protein, VGAM1187 host target protein and VGAM1188 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to

VGAM900, VGAM902, VGAM903, VGAM950, VGAM951, VGAM952, VGAM1187 and VGAM1188

[56075] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4019(VGR4019) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56076] VGR4019 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4019 gene was detected is described hereinabove with reference to Figs. 6–15.

[56077] VGR4019 gene encodes VGR4019 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56078] VGR4019 precursor RNA folds spatially, forming VGR4019 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4019 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4019 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56079] VGR4019 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1258 precursor RNA, VGAM1512 precursor RNA, VGAM1560 precursor RNA, VGAM1564 precursor RNA, VGAM2072 precursor RNA, VGAM2094 precursor RNA, VGAM2095 precursor RNA and VGAM2096 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56080] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1258

RNA, VGAM1512 RNA, VGAM1560 RNA, VGAM1564 RNA, VGAM2072 RNA, VGAM2094 RNA, VGAM2095 RNA and VGAM2096 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56081] VGAM1258 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1258 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1258 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1258 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56082] VGAM1512 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1512 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1512 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1512 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56083] VGAM1560 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1560 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1560 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1560 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56084] VGAM1564 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1564 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1564 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1564 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56085] VGAM2072 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2072 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2072 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2072 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56086] VGAM2094 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM2094 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2094 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2094 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56087] VGAM2095 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2095 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2095 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2095 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56088] VGAM2096 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2096 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2096 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2096 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56089] It is appreciated that a function of VGR4019 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4019 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4019 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4019 gene: VGAM1258 host target protein, VGAM1512 host target protein, VGAM1560 host target protein, VGAM1564 host target

protein, VGAM2072 host target protein, VGAM2094 host target protein, VGAM2095 host target protein and VGAM2096 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1258, VGAM1512, VGAM1560, VGAM1564, VGAM2072, VGAM2094, VGAM2095 and VGAM2096

[56090] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4020(VGR4020) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56091] VGR4020 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4020 gene was detected is described hereinabove with reference to Figs. 6-15.

[56092] VGR4020 gene encodes VGR4020 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56093] VGR4020 precursor RNA folds spatially, forming VGR4020 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4020 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4020 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56094] VGR4020 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2097 precursor RNA, VGAM2148 precursor RNA, VGAM2149 precursor RNA, VGAM2173 precursor RNA, VGAM2174 precursor RNA, VGAM2175 precursor RNA, VGAM2178 precursor RNA and VGAM2199 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56095] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2097 RNA, VGAM2148 RNA, VGAM2149 RNA, VGAM2173 RNA, VGAM2174 RNA, VGAM2175 RNA, VGAM2178 RNA and VGAM2199 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56096] VGAM2097 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2097 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2097 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM2097 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56097] VGAM2148 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2148 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2148 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2148 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56098] VGAM2149 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2149 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2149 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM2149 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56099] VGAM2173 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2173 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2173 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2173 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56100] VGAM2174 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2174 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2174 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2174 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56101] VGAM2175 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2175 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2175 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2175 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56102] VGAM2178 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2178 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2178 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2178 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56103] VGAM2199 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2199 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2199 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2199 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56104] It is appreciated that a function of VGR4020 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4020 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4020 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4020 gene: VGAM2097 host target protein, VGAM2148 host target protein, VGAM2149 host target protein, VGAM2173 host target protein, VGAM2174 host target protein, VGAM2175 host target protein, VGAM2178 host target protein and VGAM2199 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2097, VGAM2148, VGAM2149, VGAM2173, VGAM2174, VGAM2175, VGAM2178 and VGAM2199

[56105] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4021(VGR4021) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[56106] VGR4021 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4021 gene was detected is described hereinabove with reference to Figs. 6–15.

[56107] VGR4021 gene encodes VGR4021 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56108] VGR4021 precursor RNA folds spatially, forming VGR4021 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4021 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4021 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56109] VGR4021 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM2200 precursor RNA, VGAM2202 precursor RNA, VGAM2203 precursor RNA, VGAM2253 precursor RNA, VGAM2254 precursor RNA, VGAM2255 precursor RNA, VGAM2256 precursor RNA and VGAM2300 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56110] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2200 RNA, VGAM2202 RNA, VGAM2203 RNA, VGAM2253 RNA, VGAM2254 RNA, VGAM2255 RNA, VGAM2256 RNA and VGAM2300 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56111] VGAM2200 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2200 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2200 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2200 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56112] VGAM2202 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2202 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2202 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2202 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56113] VGAM2203 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2203 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2203 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2203 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56114] VGAM2253 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2253 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2253 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2253 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56115] VGAM2254 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2254 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2254 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2254 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56116] VGAM2255 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2255 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2255 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2255 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[56117] VGAM2256 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2256 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2256 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2256 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56118] VGAM2300 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2300 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2300 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2300 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56119] It is appreciated that a function of VGR4021 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4021 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4021 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4021 gene: VGAM2200 host target protein, VGAM2202 host target protein, VGAM2203 host target protein, VGAM2253 host target protein, VGAM2254 host target protein, VGAM2255 host target protein, VGAM2256 host target protein and VGAM2300 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2200, VGAM2202, VGAM2203, VGAM2253, VGAM2254, VGAM2255, VGAM2256 and VGAM2300

[56120] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4022(VGR4022) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56121] VGR4022 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4022 gene was detected is described hereinabove with reference to Figs. 6–15.

[56122] VGR4022 gene encodes VGR4022 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56123] VGR4022 precursor RNA folds spatially, forming VGR4022 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4022 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4022 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56124] VGR4022 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2496 precursor RNA, VGAM2552 precursor RNA, VGAM2662 precursor RNA, VGAM2663 precursor RNA, VGAM2718 precursor RNA, VGAM2719 precursor RNA, VGAM2748 precursor RNA and VGAM2815 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56125] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2496 RNA, VGAM2552 RNA, VGAM2662 RNA, VGAM2663 RNA, VGAM2718 RNA, VGAM2719 RNA, VGAM2748 RNA and

VGAM2815 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56126] VGAM2496 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2496 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2496 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2496 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56127] VGAM2552 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2552 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2552 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2552 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56128] VGAM2662 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2662 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2662 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2662 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56129] VGAM2663 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2663 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2663 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2663 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56130] VGAM2718 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2718 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2718 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2718 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56131] VGAM2719 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2719 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2719 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2719 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56132] VGAM2748 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2748 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2748 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2748 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56133] VGAM2815 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2815 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2815 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2815 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56134] It is appreciated that a function of VGR4022 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4022 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4022 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4022 gene: VGAM2496 host target protein, VGAM2552 host target protein, VGAM2662 host target protein, VGAM2663 host target protein, VGAM2718 host target protein, VGAM2719 host target protein, VGAM2748 host target protein and

VGAM2815 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2496, VGAM2552, VGAM2662, VGAM2663, VGAM2718, VGAM2719, VGAM2748 and VGAM2815

[56135] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4023(VGR4023) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56136] VGR4023 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4023 gene was detected is described hereinabove with reference to Figs. 6-15.

[56137] VGR4023 gene encodes VGR4023 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56138] VGR4023 precursor RNA folds spatially, forming VGR4023 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4023 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4023 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56139] VGR4023 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2838 precursor RNA, VGAM2842 precursor RNA, VGAM2862 precursor RNA, VGAM2864 precursor RNA, VGAM2878 precursor RNA, VGAM2888 precursor RNA, VGAM2889 precursor RNA and VGAM2890 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56140] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2838 RNA, VGAM2842 RNA, VGAM2862 RNA, VGAM2864 RNA, VGAM2878 RNA, VGAM2888 RNA, VGAM2889 RNA and VGAM2890 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56141] VGAM2838 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2838 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2838 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2838 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[56142] VGAM2842 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2842 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2842 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2842 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56143] VGAM2862 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2862 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2862 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2862 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56144] VGAM2864 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2864 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2864 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2864 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56145] VGAM2878 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2878 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2878 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM2878 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56146] VGAM2888 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2888 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2888 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2888 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56147] VGAM2889 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2889 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2889 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM2889 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56148] VGAM2890 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2890 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2890 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2890 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56149] It is appreciated that a function of VGR4023 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4023 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4023 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4023 gene: VGAM2838 host target protein, VGAM2842 host target protein, VGAM2862 host target protein, VGAM2864 host target protein, VGAM2878 host target protein, VGAM2888 host target protein, VGAM2889 host target protein and VGAM2890 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2838, VGAM2842, VGAM2862, VGAM2864, VGAM2878, VGAM2888, VGAM2889 and VGAM2890

[56150] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4024(VGR4024) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56151] VGR4024 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4024 gene was detected is described hereinabove with reference to Figs. 6–15.

[56152] VGR4024 gene encodes VGR4024 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56153] VGR4024 precursor RNA folds spatially, forming VGR4024 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4024 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4024 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56154] VGR4024 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2897 precursor RNA, VGAM2905 precursor RNA, VGAM2942 precursor RNA, VGAM2957 pre–

cursor RNA, VGAM2966 precursor RNA, VGAM3074 precursor RNA, VGAM3118 precursor RNA and VGAM3129 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56155] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2897 RNA, VGAM2905 RNA, VGAM2942 RNA, VGAM2957 RNA, VGAM2966 RNA, VGAM3074 RNA, VGAM3118 RNA and VGAM3129 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56156] VGAM2897 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2897 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2897 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2897 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56157] VGAM2905 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2905 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2905 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2905 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56158] VGAM2942 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2942 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2942 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2942 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56159] VGAM2957 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2957 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2957 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2957 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56160] VGAM2966 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM2966 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2966 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2966 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56161] VGAM3074 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3074 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3074 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3074 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56162] VGAM3118 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3118 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3118 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3118 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56163] VGAM3129 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3129 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3129 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3129 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56164] It is appreciated that a function of VGR4024 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4024 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4024 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4024 gene: VGAM2897 host target protein, VGAM2905 host target protein, VGAM2942 host target protein, VGAM2957 host target protein, VGAM2966 host target protein, VGAM3074 host target protein, VGAM3118 host target protein and VGAM3129 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2897, VGAM2905, VGAM2942, VGAM2957, VGAM2966, VGAM3074, VGAM3118 and VGAM3129

[56165] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4025(VGR4025) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56166] VGR4025 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4025 gene was detected is described hereinabove with reference to Figs. 6–15.

[56167] VGR4025 gene encodes VGR4025 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56168] VGR4025 precursor RNA folds spatially, forming VGR4025 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4025 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4025 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56169] VGR4025 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3233 precursor RNA, VGAM3272 precursor RNA, VGAM3297 precursor RNA, VGAM3401 precursor RNA, VGAM3434 precursor RNA, VGAM3439 precursor RNA, VGAM3440 precursor RNA and VGAM3562 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56170] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3233 RNA, VGAM3272 RNA, VGAM3297 RNA, VGAM3401 RNA, VGAM3434 RNA, VGAM3439 RNA, VGAM3440 RNA and VGAM3562 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56171] VGAM3233 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3233 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3233 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3233 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56172] VGAM3272 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3272 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3272 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM3272 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56173] VGAM3297 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3297 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3297 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3297 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56174] VGAM3401 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3401 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3401 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3401 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56175] VGAM3434 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3434 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3434 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3434 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56176] VGAM3439 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3439 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3439 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3439 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56177] VGAM3440 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3440 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3440 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3440 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56178] VGAM3562 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3562 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3562 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3562 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56179] It is appreciated that a function of VGR4025 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4025 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4025 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4025 gene: VGAM3233 host target protein, VGAM3272 host target protein, VGAM3297 host target protein, VGAM3401 host target protein, VGAM3434 host target protein, VGAM3439 host target protein, VGAM3440 host target protein and VGAM3562 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through

VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3233, VGAM3272, VGAM3297, VGAM3401, VGAM3434, VGAM3439, VGAM3440 and VGAM3562

[56180] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4026(VGR4026) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56181] VGR4026 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4026 gene was detected is described hereinabove with reference to Figs. 6–15.

[56182] VGR4026 gene encodes VGR4026 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56183] VGR4026 precursor RNA folds spatially, forming VGR4026 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4026 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4026 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56184] VGR4026 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM3563 precursor RNA, VGAM3582 precursor RNA, VGAM3597 precursor RNA, VGAM3669 precursor RNA, VGAM3670 precursor RNA and VGAM3828 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56185] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM3563 RNA, VGAM3582 RNA, VGAM3597 RNA, VGAM3669 RNA, VGAM3670 RNA and VGAM3828 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56186] VGAM3563 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3563 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3563 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3563 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56187] VGAM3582 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3582 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3582 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3582 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56188] VGAM3597 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3597 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3597 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3597 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56189] VGAM3669 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3669 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3669 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3669 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56190] VGAM3670 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3670 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3670 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3670 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56191] VGAM3828 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM3828 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3828 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3828 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56192] It is appreciated that a function of VGR4026 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4026 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4026 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4026 gene: VGAM3563 host target protein, VGAM3582 host target protein, VGAM3597 host target protein, VGAM3669 host target protein, VGAM3670 host target protein and VGAM3828

host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3563, VGAM3582, VGAM3597, VGAM3669, VGAM3670 and VGAM3828

[56193] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4027(VGR4027) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56194] VGR4027 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4027 gene was detected is described hereinabove with reference to Figs. 6-15.

[56195] VGR4027 gene encodes VGR4027 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56196] VGR4027 precursor RNA folds spatially, forming VGR4027

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4027 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4027 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56197] VGR4027 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3171 precursor RNA and VGAM3172 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56198] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3171 RNA and VGAM3172 RNA respectively, herein schemati-

cally represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56199] VGAM3171 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3171 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3171 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3171 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56200] VGAM3172 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3172 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3172 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM3172 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56201] It is appreciated that a function of VGR4027 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4027 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4027 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4027 gene: VGAM3171 host target protein and VGAM3172 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3171 and VGAM3172

[56202] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4028(VGR4028) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56203] VGR4028 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4028 gene was detected is described hereinabove with reference to Figs. 6–15.

[56204] VGR4028 gene encodes VGR4028 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56205] VGR4028 precursor RNA folds spatially, forming VGR4028 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4028 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4028 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56206] VGR4028 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1623 precursor RNA, VGAM1629 precursor RNA, VGAM1630 precursor RNA, VGAM1633 precursor RNA and VGAM2594 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56207] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1623 RNA, VGAM1629 RNA, VGAM1630 RNA, VGAM1633 RNA and VGAM2594 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56208] VGAM1623 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1623 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1623 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1623 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56209] VGAM1629 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1629 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1629 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1629 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56210] VGAM1630 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1630 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1630 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1630 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56211] VGAM1633 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1633 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1633 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1633 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56212] VGAM2594 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM2594 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2594 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2594 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56213] It is appreciated that a function of VGR4028 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4028 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4028 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4028 gene: VGAM1623 host target protein, VGAM1629 host target protein, VGAM1630 host target protein, VGAM1633 host target protein and VGAM2594 host target protein, herein

schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1623, VGAM1629, VGAM1630, VGAM1633 and VGAM2594

[56214] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4029(VGR4029) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56215] VGR4029 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4029 gene was detected is described hereinabove with reference to Figs. 6-15.

[56216] VGR4029 gene encodes VGR4029 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56217] VGR4029 precursor RNA folds spatially, forming VGR4029 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4029 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4029 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56218] VGR4029 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1286 precursor RNA, VGAM1545 precursor RNA, VGAM1798 precursor RNA, VGAM1801 precursor RNA, VGAM2274 precursor RNA, VGAM2276 precursor RNA, VGAM2488 precursor RNA and VGAM3400 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56219] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1286 RNA, VGAM1545 RNA, VGAM1798 RNA, VGAM1801 RNA, VGAM2274 RNA, VGAM2276 RNA, VGAM2488 RNA and VGAM3400 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56220] VGAM1286 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1286 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1286 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1286 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56221] VGAM1545 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1545 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1545 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1545 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56222] VGAM1798 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1798 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1798 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1798 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56223] VGAM1801 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1801 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1801 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1801 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56224] VGAM2274 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2274 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2274 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2274 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[56225] VGAM2276 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2276 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2276 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2276 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56226] VGAM2488 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2488 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2488 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2488 host target protein, herein schematically

represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56227] VGAM3400 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3400 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3400 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3400 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56228] It is appreciated that a function of VGR4029 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4029 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4029 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4029 gene: VGAM1286 host target protein, VGAM1545 host target protein, VGAM1798 host target protein, VGAM1801 host target protein, VGAM2274 host target protein, VGAM2276 host target protein, VGAM2488 host target protein and VGAM3400 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1286, VGAM1545, VGAM1798, VGAM1801, VGAM2274, VGAM2276, VGAM2488 and VGAM3400

[56229] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4030(VGR4030) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56230] VGR4030 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4030 gene was

detected is described hereinabove with reference to Figs. 6–15.

[56231] VGR4030 gene encodes VGR4030 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56232] VGR4030 precursor RNA folds spatially, forming VGR4030 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4030 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4030 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56233] VGR4030 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM953 precursor RNA, VGAM954 precursor RNA, VGAM2949 precursor RNA and VGAM2952 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and

VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56234] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM953 RNA, VGAM954 RNA, VGAM2949 RNA and VGAM2952 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56235] VGAM953 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM953 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM953 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM953 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56236] VGAM954 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM954 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM954 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM954 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56237] VGAM2949 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2949 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2949 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2949 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[56238] VGAM2952 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2952 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2952 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2952 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56239] It is appreciated that a function of VGR4030 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4030 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4030 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4030 gene: VGAM953 host

target protein, VGAM954 host target protein, VGAM2949 host target protein and VGAM2952 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM953, VGAM954, VGAM2949 and VGAM2952

[56240] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4031(VGR4031) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56241] VGR4031 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4031 gene was detected is described hereinabove with reference to Figs. 6-15.

[56242] VGR4031 gene encodes VGR4031 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56243] VGR4031 precursor RNA folds spatially, forming VGR4031 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4031 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4031 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56244] VGR4031 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM676 precursor RNA, VGAM678 precursor RNA and VGAM679 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56245] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM676

RNA, VGAM678 RNA and VGAM679 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56246] VGAM676 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM676 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM676 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM676 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56247] VGAM678 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM678 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM678 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM678 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56248] VGAM679 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM679 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM679 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM679 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56249] It is appreciated that a function of VGR4031 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4031 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4031

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4031 gene: VGAM676 host target protein, VGAM678 host target protein and VGAM679 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM676, VGAM678 and VGAM679

[56250] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4032(VGR4032) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56251] VGR4032 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4032 gene was detected is described hereinabove with reference to Figs. 6-15.

[56252] VGR4032 gene encodes VGR4032 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56253] VGR4032 precursor RNA folds spatially, forming VGR4032 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4032 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4032 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56254] VGR4032 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM629 precursor RNA, VGAM913 precursor RNA, VGAM957 precursor RNA, VGAM958 precursor RNA, VGAM994 precursor RNA, VGAM995 precursor RNA, VGAM996 precursor RNA and VGAM997 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRE-

CURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56255] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM629 RNA, VGAM913 RNA, VGAM957 RNA, VGAM958 RNA, VGAM994 RNA, VGAM995 RNA, VGAM996 RNA and VGAM997 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56256] VGAM629 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM629 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM629 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM629 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56257] VGAM913 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM913 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM913 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM913 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56258] VGAM957 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM957 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM957 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM957 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56259] VGAM958 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM958 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM958 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM958 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56260] VGAM994 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM994 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM994 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM994 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56261] VGAM995 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM995 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM995 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM995 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56262] VGAM996 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM996 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM996 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM996 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56263] VGAM997 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM997 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM997 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM997 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56264] It is appreciated that a function of VGR4032 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4032 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4032 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4032 gene: VGAM629 host target protein, VGAM913 host target protein, VGAM957 host target protein, VGAM958 host target protein, VGAM994 host target protein, VGAM995 host target protein, VGAM996 host target protein and VGAM997 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM629, VGAM913, VGAM957, VGAM958, VGAM994, VGAM995, VGAM996 and VGAM997

[56265] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4033(VGR4033) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[56266] VGR4033 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4033 gene was detected is described hereinabove with reference to Figs. 6–15.

[56267] VGR4033 gene encodes VGR4033 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56268] VGR4033 precursor RNA folds spatially, forming VGR4033 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4033 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4033 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56269] VGR4033 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM1028 precursor RNA, VGAM1029 precursor RNA, VGAM1033 precursor RNA, VGAM1034 precursor RNA, VGAM1036 precursor RNA, VGAM1037 precursor RNA, VGAM1129 precursor RNA and VGAM1130 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56270] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1028 RNA, VGAM1029 RNA, VGAM1033 RNA, VGAM1034 RNA, VGAM1036 RNA, VGAM1037 RNA, VGAM1129 RNA and VGAM1130 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56271] VGAM1028 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM1028 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1028 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1028 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56272] VGAM1029 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1029 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1029 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1029 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56273] VGAM1033 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1033 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1033 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1033 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56274] VGAM1034 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1034 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1034 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1034 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56275] VGAM1036 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1036 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1036 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1036 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56276] VGAM1037 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1037 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1037 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1037 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[56277] VGAM1129 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1129 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1129 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1129 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56278] VGAM1130 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1130 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1130 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1130 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56279] It is appreciated that a function of VGR4033 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4033 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4033 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4033 gene: VGAM1028 host target protein, VGAM1029 host target protein, VGAM1033 host target protein, VGAM1034 host target protein, VGAM1036 host target protein, VGAM1037 host target protein, VGAM1129 host target protein and VGAM1130 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1028, VGAM1029, VGAM1033, VGAM1034, VGAM1036, VGAM1037, VGAM1129 and VGAM1130

[56280] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4034(VGR4034) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56281] VGR4034 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4034 gene was detected is described hereinabove with reference to Figs. 6–15.

[56282] VGR4034 gene encodes VGR4034 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56283] VGR4034 precursor RNA folds spatially, forming VGR4034 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4034 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4034 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56284] VGR4034 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1131 precursor RNA, VGAM1138 precursor RNA, VGAM1139 precursor RNA, VGAM1140 precursor RNA, VGAM1261 precursor RNA, VGAM1262 precursor RNA, VGAM1263 precursor RNA and VGAM1289 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56285] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1131 RNA, VGAM1138 RNA, VGAM1139 RNA, VGAM1140 RNA, VGAM1261 RNA, VGAM1262 RNA, VGAM1263 RNA and

VGAM1289 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56286] VGAM1131 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1131 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1131 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1131 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56287] VGAM1138 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1138 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1138 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1138 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56288] VGAM1139 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1139 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1139 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1139 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56289] VGAM1140 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1140 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1140 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1140 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56290] VGAM1261 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1261 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1261 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1261 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56291] VGAM1262 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1262 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1262 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1262 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56292] VGAM1263 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1263 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1263 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1263 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56293] VGAM1289 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1289 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1289 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1289 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56294] It is appreciated that a function of VGR4034 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4034 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4034 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4034 gene: VGAM1131 host target protein, VGAM1138 host target protein, VGAM1139 host target protein, VGAM1140 host target protein, VGAM1261 host target protein, VGAM1262 host target protein, VGAM1263 host target protein and

VGAM1289 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1131, VGAM1138, VGAM1139, VGAM1140, VGAM1261, VGAM1262, VGAM1263 and VGAM1289

[56295] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4035(VGR4035) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56296] VGR4035 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4035 gene was detected is described hereinabove with reference to Figs. 6-15.

[56297] VGR4035 gene encodes VGR4035 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56298] VGR4035 precursor RNA folds spatially, forming VGR4035 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4035 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4035 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56299] VGR4035 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1290 precursor RNA, VGAM1413 precursor RNA, VGAM1851 precursor RNA, VGAM2033 precursor RNA, VGAM2034 precursor RNA, VGAM2037 precursor RNA, VGAM2038 precursor RNA and VGAM2111 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56300] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1290 RNA, VGAM1413 RNA, VGAM1851 RNA, VGAM2033 RNA, VGAM2034 RNA, VGAM2037 RNA, VGAM2038 RNA and VGAM2111 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56301] VGAM1290 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1290 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1290 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1290 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[56302] VGAM1413 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1413 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1413 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1413 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56303] VGAM1851 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1851 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1851 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1851 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56304] VGAM2033 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2033 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2033 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2033 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56305] VGAM2034 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2034 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2034 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM2034 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56306] VGAM2037 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2037 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2037 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2037 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56307] VGAM2038 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2038 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2038 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM2038 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56308] VGAM2111 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2111 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2111 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2111 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56309] It is appreciated that a function of VGR4035 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4035 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4035 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4035 gene: VGAM1290 host target protein, VGAM1413 host target protein, VGAM1851 host target protein, VGAM2033 host target protein, VGAM2034 host target protein, VGAM2037 host target protein, VGAM2038 host target protein and VGAM2111 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1290, VGAM1413, VGAM1851, VGAM2033, VGAM2034, VGAM2037, VGAM2038 and VGAM2111

[56310] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4036(VGR4036) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56311] VGR4036 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4036 gene was detected is described hereinabove with reference to Figs. 6–15.

[56312] VGR4036 gene encodes VGR4036 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56313] VGR4036 precursor RNA folds spatially, forming VGR4036 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4036 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4036 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56314] VGR4036 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2151 precursor RNA, VGAM2152 precursor RNA, VGAM2229 precursor RNA, VGAM2352 pre–

cursor RNA, VGAM2652 precursor RNA, VGAM2653 precursor RNA, VGAM2775 precursor RNA and VGAM2880 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56315] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2151 RNA, VGAM2152 RNA, VGAM2229 RNA, VGAM2352 RNA, VGAM2652 RNA, VGAM2653 RNA, VGAM2775 RNA and VGAM2880 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56316] VGAM2151 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2151 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2151 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2151 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56317] VGAM2152 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2152 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2152 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2152 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56318] VGAM2229 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2229 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2229 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2229 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56319] VGAM2352 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2352 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2352 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2352 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56320] VGAM2652 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM2652 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2652 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2652 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56321] VGAM2653 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2653 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2653 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2653 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56322] VGAM2775 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2775 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2775 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2775 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56323] VGAM2880 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2880 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2880 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2880 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56324] It is appreciated that a function of VGR4036 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4036 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4036 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4036 gene: VGAM2151 host target protein, VGAM2152 host target protein, VGAM2229 host target protein, VGAM2352 host target protein, VGAM2652 host target protein, VGAM2653 host target protein, VGAM2775 host target protein and VGAM2880 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2151, VGAM2152, VGAM2229, VGAM2352, VGAM2652, VGAM2653, VGAM2775 and VGAM2880

[56325] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4037(VGR4037) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56326] VGR4037 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4037 gene was detected is described hereinabove with reference to Figs. 6–15.

[56327] VGR4037 gene encodes VGR4037 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56328] VGR4037 precursor RNA folds spatially, forming VGR4037 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4037 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4037 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56329] VGR4037 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2881 precursor RNA, VGAM2934 precursor RNA, VGAM3012 precursor RNA, VGAM3079 precursor RNA, VGAM3086 precursor RNA, VGAM3087 precursor RNA, VGAM3153 precursor RNA and VGAM3154 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56330] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2881 RNA, VGAM2934 RNA, VGAM3012 RNA, VGAM3079 RNA, VGAM3086 RNA, VGAM3087 RNA, VGAM3153 RNA and VGAM3154 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56331] VGAM2881 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2881 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2881 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2881 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56332] VGAM2934 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2934 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2934 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM2934 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56333] VGAM3012 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3012 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3012 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3012 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56334] VGAM3079 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3079 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3079 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3079 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56335] VGAM3086 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3086 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3086 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3086 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56336] VGAM3087 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3087 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3087 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3087 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56337] VGAM3153 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3153 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3153 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3153 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56338] VGAM3154 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3154 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3154 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3154 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56339] It is appreciated that a function of VGR4037 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4037 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4037 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4037 gene: VGAM2881 host target protein, VGAM2934 host target protein, VGAM3012 host target protein, VGAM3079 host target protein, VGAM3086 host target protein, VGAM3087 host target protein, VGAM3153 host target protein and VGAM3154 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through

VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2881, VGAM2934, VGAM3012, VGAM3079, VGAM3086, VGAM3087, VGAM3153 and VGAM3154

[56340] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4038(VGR4038) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56341] VGR4038 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4038 gene was detected is described hereinabove with reference to Figs. 6–15.

[56342] VGR4038 gene encodes VGR4038 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56343] VGR4038 precursor RNA folds spatially, forming VGR4038 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4038 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4038 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56344] VGR4038 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM3405 precursor RNA, VGAM3472 precursor RNA, VGAM3529 precursor RNA, VGAM3593 precursor RNA, VGAM3652 precursor RNA and VGAM3677 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56345] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM3405 RNA, VGAM3472 RNA, VGAM3529 RNA, VGAM3593 RNA, VGAM3652 RNA and VGAM3677 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56346] VGAM3405 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3405 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3405 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3405 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56347] VGAM3472 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3472 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3472 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3472 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56348] VGAM3529 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3529 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3529 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3529 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56349] VGAM3593 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3593 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3593 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3593 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56350] VGAM3652 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3652 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3652 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3652 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56351] VGAM3677 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM3677 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3677 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3677 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56352] It is appreciated that a function of VGR4038 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4038 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4038 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4038 gene: VGAM3405 host target protein, VGAM3472 host target protein, VGAM3529 host target protein, VGAM3593 host target protein, VGAM3652 host target protein and VGAM3677

host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3405, VGAM3472, VGAM3529, VGAM3593, VGAM3652 and VGAM3677

[56353] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4039(VGR4039) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56354] VGR4039 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4039 gene was detected is described hereinabove with reference to Figs. 6-15.

[56355] VGR4039 gene encodes VGR4039 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56356] VGR4039 precursor RNA folds spatially, forming VGR4039

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4039 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4039 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56357] VGR4039 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM274 precursor RNA, VGAM427 precursor RNA, VGAM428 precursor RNA, VGAM429 precursor RNA, VGAM585 precursor RNA, VGAM586 precursor RNA, VGAM699 precursor RNA and VGAM834 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECUR-

SOR RNA of Fig. 8.

[56358] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM274 RNA, VGAM427 RNA, VGAM428 RNA, VGAM429 RNA, VGAM585 RNA, VGAM586 RNA, VGAM699 RNA and VGAM834 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56359] VGAM274 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM274 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM274 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM274 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56360] VGAM427 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM427 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM427 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM427 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56361] VGAM428 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM428 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM428 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM428 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[56362] VGAM429 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM429 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM429 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM429 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56363] VGAM585 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM585 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM585 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM585 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56364] VGAM586 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM586 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM586 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM586 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56365] VGAM699 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM699 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM699 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM699 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56366] VGAM834 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM834 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM834 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM834 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56367] It is appreciated that a function of VGR4039 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4039 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4039 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4039 gene: VGAM274 host target protein, VGAM427 host target protein, VGAM428 host target protein, VGAM429 host target protein, VGAM585 host target protein, VGAM586 host target protein, VGAM699 host target protein and VGAM834 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM274, VGAM427, VGAM428, VGAM429, VGAM585, VGAM586, VGAM699 and VGAM834

[56368] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4040(VGR4040) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56369] VGR4040 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4040 gene was

detected is described hereinabove with reference to Figs. 6–15.

[56370] VGR4040 gene encodes VGR4040 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56371] VGR4040 precursor RNA folds spatially, forming VGR4040 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4040 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4040 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56372] VGR4040 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM850 precursor RNA, VGAM972 precursor RNA, VGAM988 precursor RNA, VGAM990 precursor RNA, VGAM991 precursor RNA, VGAM993 precursor RNA, VGAM1159 precursor RNA and VGAM1264 precursor RNA,

herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56373] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM850 RNA, VGAM972 RNA, VGAM988 RNA, VGAM990 RNA, VGAM991 RNA, VGAM993 RNA, VGAM1159 RNA and VGAM1264 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56374] VGAM850 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM850 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM850 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM850 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56375] VGAM972 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM972 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM972 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM972 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56376] VGAM988 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM988 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM988 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM988 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56377] VGAM990 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM990 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM990 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM990 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56378] VGAM991 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM991 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM991 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM991 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56379] VGAM993 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM993 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM993 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM993 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56380] VGAM1159 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1159 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1159 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1159 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56381] VGAM1264 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1264 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1264 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1264 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56382] It is appreciated that a function of VGR4040 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4040 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4040 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4040 gene: VGAM850 host target protein, VGAM972 host target protein, VGAM988 host target protein, VGAM990 host target protein, VGAM991 host target protein, VGAM993 host target protein, VGAM1159 host target protein and VGAM1264 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM850, VGAM972, VGAM988, VGAM990, VGAM991, VGAM993, VGAM1159 and VGAM1264

[56383] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4041(VGR4041) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56384] VGR4041 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4041 gene was detected is described hereinabove with reference to Figs. 6–15.

[56385] VGR4041 gene encodes VGR4041 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56386] VGR4041 precursor RNA folds spatially, forming VGR4041 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4041 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4041 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56387] VGR4041 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1266 precursor RNA, VGAM1281 precursor RNA, VGAM1790 precursor RNA, VGAM1791 precursor RNA, VGAM1793 precursor RNA, VGAM1874 precursor RNA, VGAM1876 precursor RNA and VGAM1878 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56388] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1266 RNA, VGAM1281 RNA, VGAM1790 RNA, VGAM1791 RNA, VGAM1793 RNA, VGAM1874 RNA, VGAM1876 RNA and VGAM1878 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56389] VGAM1266 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1266 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1266 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1266 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56390] VGAM1281 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1281 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1281 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1281 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[56391] VGAM1790 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1790 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1790 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1790 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56392] VGAM1791 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1791 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1791 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1791 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56393] VGAM1793 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1793 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1793 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1793 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56394] VGAM1874 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1874 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1874 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM1874 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56395] VGAM1876 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1876 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1876 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1876 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56396] VGAM1878 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1878 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1878 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM1878 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56397] It is appreciated that a function of VGR4041 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4041 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4041 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4041 gene: VGAM1266 host target protein, VGAM1281 host target protein, VGAM1790 host target protein, VGAM1791 host target protein, VGAM1793 host target protein, VGAM1874 host target protein, VGAM1876 host target protein and VGAM1878 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1266, VGAM1281, VGAM1790,

VGAM1791, VGAM1793, VGAM1874, VGAM1876 and VGAM1878

[56398] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4042(VGR4042) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56399] VGR4042 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4042 gene was detected is described hereinabove with reference to Figs. 6–15.

[56400] VGR4042 gene encodes VGR4042 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56401] VGR4042 precursor RNA folds spatially, forming VGR4042 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4042 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4042 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56402] VGR4042 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1991 precursor RNA, VGAM1993 precursor RNA, VGAM2035 precursor RNA, VGAM2036 precursor RNA, VGAM2056 precursor RNA, VGAM2058 precursor RNA, VGAM2060 precursor RNA and VGAM2210 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56403] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1991

RNA, VGAM1993 RNA, VGAM2035 RNA, VGAM2036 RNA, VGAM2056 RNA, VGAM2058 RNA, VGAM2060 RNA and VGAM2210 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56404] VGAM1991 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1991 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1991 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1991 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56405] VGAM1993 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1993 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1993 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1993 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56406] VGAM2035 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2035 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2035 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2035 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56407] VGAM2036 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2036 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2036 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2036 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56408] VGAM2056 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2056 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2056 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2056 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56409] VGAM2058 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM2058 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2058 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2058 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56410] VGAM2060 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2060 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2060 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2060 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56411] VGAM2210 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2210 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2210 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2210 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56412] It is appreciated that a function of VGR4042 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4042 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4042 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4042 gene: VGAM1991 host target protein, VGAM1993 host target protein, VGAM2035 host target protein, VGAM2036 host target

protein, VGAM2056 host target protein, VGAM2058 host target protein, VGAM2060 host target protein and VGAM2210 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1991, VGAM1993, VGAM2035, VGAM2036, VGAM2056, VGAM2058, VGAM2060 and VGAM2210

[56413] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4043(VGR4043) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56414] VGR4043 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4043 gene was detected is described hereinabove with reference to Figs. 6-15.

[56415] VGR4043 gene encodes VGR4043 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56416] VGR4043 precursor RNA folds spatially, forming VGR4043 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4043 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4043 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56417] VGR4043 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2211 precursor RNA, VGAM2301 precursor RNA, VGAM2302 precursor RNA, VGAM2317 precursor RNA, VGAM2319 precursor RNA, VGAM2380 precursor RNA, VGAM2473 precursor RNA and VGAM2474 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56418] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2211 RNA, VGAM2301 RNA, VGAM2302 RNA, VGAM2317 RNA, VGAM2319 RNA, VGAM2380 RNA, VGAM2473 RNA and VGAM2474 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56419] VGAM2211 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2211 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2211 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM2211 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56420] VGAM2301 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2301 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2301 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2301 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56421] VGAM2302 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2302 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2302 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM2302 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56422] VGAM2317 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2317 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2317 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2317 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56423] VGAM2319 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2319 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2319 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2319 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56424] VGAM2380 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2380 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2380 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2380 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56425] VGAM2473 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2473 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2473 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2473 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56426] VGAM2474 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2474 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2474 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2474 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56427] It is appreciated that a function of VGR4043 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4043 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4043 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4043 gene: VGAM2211 host target protein, VGAM2301 host target protein, VGAM2302 host target protein, VGAM2317 host target protein, VGAM2319 host target protein, VGAM2380 host target protein, VGAM2473 host target protein and VGAM2474 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2211, VGAM2301, VGAM2302, VGAM2317, VGAM2319, VGAM2380, VGAM2473 and VGAM2474

[56428] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4044(VGR4044) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[56429] VGR4044 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4044 gene was detected is described hereinabove with reference to Figs. 6–15.

[56430] VGR4044 gene encodes VGR4044 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56431] VGR4044 precursor RNA folds spatially, forming VGR4044 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4044 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4044 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56432] VGR4044 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM2475 precursor RNA, VGAM2597 precursor RNA, VGAM2767 precursor RNA, VGAM2774 precursor RNA, VGAM2977 precursor RNA, VGAM3363 precursor RNA, VGAM3417 precursor RNA and VGAM3418 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56433] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2475 RNA, VGAM2597 RNA, VGAM2767 RNA, VGAM2774 RNA, VGAM2977 RNA, VGAM3363 RNA, VGAM3417 RNA and VGAM3418 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56434] VGAM2475 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2475 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2475 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2475 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56435] VGAM2597 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2597 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2597 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2597 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56436] VGAM2767 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2767 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2767 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2767 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56437] VGAM2774 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2774 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2774 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2774 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56438] VGAM2977 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2977 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2977 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2977 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56439] VGAM3363 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3363 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3363 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3363 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[56440] VGAM3417 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3417 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3417 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3417 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56441] VGAM3418 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3418 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3418 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3418 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56442] It is appreciated that a function of VGR4044 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4044 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4044 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4044 gene: VGAM2475 host target protein, VGAM2597 host target protein, VGAM2767 host target protein, VGAM2774 host target protein, VGAM2977 host target protein, VGAM3363 host target protein, VGAM3417 host target protein and VGAM3418 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2475, VGAM2597, VGAM2767, VGAM2774, VGAM2977, VGAM3363, VGAM3417 and VGAM3418

[56443] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4045(VGR4045) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56444] VGR4045 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4045 gene was detected is described hereinabove with reference to Figs. 6–15.

[56445] VGR4045 gene encodes VGR4045 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56446] VGR4045 precursor RNA folds spatially, forming VGR4045 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4045 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4045 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56447] VGR4045 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM3567 precursor RNA, VGAM3606 precursor RNA, VGAM3703 precursor RNA, VGAM3731 precursor RNA and VGAM3805 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56448] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3567 RNA, VGAM3606 RNA, VGAM3703 RNA, VGAM3731 RNA and VGAM3805 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56449] VGAM3567 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3567 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3567 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3567 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56450] VGAM3606 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3606 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3606 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3606 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[56451] VGAM3703 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3703 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3703 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3703 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56452] VGAM3731 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3731 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3731 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3731 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56453] VGAM3805 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3805 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3805 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3805 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56454] It is appreciated that a function of VGR4045 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4045 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4045 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4045 gene: VGAM3567 host target protein, VGAM3606 host target protein, VGAM3703 host target protein, VGAM3731 host target protein and VGAM3805 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3567, VGAM3606, VGAM3703, VGAM3731 and VGAM3805

[56455] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4046(VGR4046) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56456] VGR4046 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4046 gene was detected is described hereinabove with reference to Figs. 6-15.

[56457] VGR4046 gene encodes VGR4046 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56458] VGR4046 precursor RNA folds spatially, forming VGR4046 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4046 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4046 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56459] VGR4046 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2639 precursor RNA and VGAM2844 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56460] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2639 RNA and VGAM2844 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56461] VGAM2639 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2639 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2639 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2639 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56462] VGAM2844 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2844 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2844 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2844 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56463] It is appreciated that a function of VGR4046 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4046 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4046 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4046 gene: VGAM2639 host target protein and VGAM2844 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2639 and VGAM2844

[56464] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4047(VGR4047) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56465] VGR4047 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4047 gene was detected is described hereinabove with reference to Figs. 6–15.

[56466] VGR4047 gene encodes VGR4047 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56467] VGR4047 precursor RNA folds spatially, forming VGR4047 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4047 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4047 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56468] VGR4047 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2482 precursor RNA, VGAM2935 precursor RNA and VGAM2936 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56469] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2482 RNA, VGAM2935 RNA and VGAM2936 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56470] VGAM2482 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2482 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2482 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2482 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56471] VGAM2935 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2935 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2935 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2935 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56472] VGAM2936 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM2936 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2936 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2936 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56473] It is appreciated that a function of VGR4047 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4047 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4047 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4047 gene: VGAM2482 host target protein, VGAM2935 host target protein and VGAM2936 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through

VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2482, VGAM2935 and VGAM2936

[56474] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4048(VGR4048) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56475] VGR4048 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4048 gene was detected is described hereinabove with reference to Figs. 6–15.

[56476] VGR4048 gene encodes VGR4048 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56477] VGR4048 precursor RNA folds spatially, forming VGR4048 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4048 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4048 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56478] VGR4048 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2765 precursor RNA and VGAM2766 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56479] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2765 RNA and VGAM2766 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56480] VGAM2765 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2765 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2765 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2765 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56481] VGAM2766 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2766 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2766 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2766 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[56482] It is appreciated that a function of VGR4048 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4048 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4048 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4048 gene: VGAM2765 host target protein and VGAM2766 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2765 and VGAM2766

[56483] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4049(VGR4049) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[56484] VGR4049 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4049 gene was detected is described hereinabove with reference to Figs. 6–15.

[56485] VGR4049 gene encodes VGR4049 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56486] VGR4049 precursor RNA folds spatially, forming VGR4049 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4049 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4049 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56487] VGR4049 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM pre–

cursor RNAs, VGAM1024 precursor RNA, VGAM1025 precursor RNA, VGAM2523 precursor RNA and VGAM2524 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56488] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1024 RNA, VGAM1025 RNA, VGAM2523 RNA and VGAM2524 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56489] VGAM1024 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1024 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1024 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1024 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56490] VGAM1025 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1025 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1025 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1025 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56491] VGAM2523 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2523 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2523 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2523 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56492] VGAM2524 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2524 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2524 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2524 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56493] It is appreciated that a function of VGR4049 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4049 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4049 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4049 gene: VGAM1024 host target protein, VGAM1025 host target protein, VGAM2523 host target protein and VGAM2524 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1024, VGAM1025, VGAM2523 and VGAM2524

[56494] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4050(VGR4050) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56495] VGR4050 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4050 gene was

detected is described hereinabove with reference to Figs. 6–15.

[56496] VGR4050 gene encodes VGR4050 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56497] VGR4050 precursor RNA folds spatially, forming VGR4050 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4050 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4050 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56498] VGR4050 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1783 precursor RNA, VGAM1786 precursor RNA, VGAM1788 precursor RNA, VGAM1789 precursor RNA and VGAM3207 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2

PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56499] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1783 RNA, VGAM1786 RNA, VGAM1788 RNA, VGAM1789 RNA and VGAM3207 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56500] VGAM1783 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1783 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1783 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1783 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[56501] VGAM1786 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1786 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1786 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1786 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56502] VGAM1788 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1788 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1788 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1788 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56503] VGAM1789 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1789 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1789 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1789 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56504] VGAM3207 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3207 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3207 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM3207 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56505] It is appreciated that a function of VGR4050 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4050 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4050 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4050 gene: VGAM1783 host target protein, VGAM1786 host target protein, VGAM1788 host target protein, VGAM1789 host target protein and VGAM3207 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1783, VGAM1786, VGAM1788, VGAM1789 and VGAM3207

[56506] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4051(VGR4051) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56507] VGR4051 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4051 gene was detected is described hereinabove with reference to Figs. 6–15.

[56508] VGR4051 gene encodes VGR4051 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56509] VGR4051 precursor RNA folds spatially, forming VGR4051 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4051 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4051 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56510] VGR4051 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2165 precursor RNA, VGAM2182 precursor RNA, VGAM2243 precursor RNA, VGAM2456 precursor RNA and VGAM3807 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56511] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2165 RNA, VGAM2182 RNA, VGAM2243 RNA, VGAM2456 RNA and VGAM3807 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56512] VGAM2165 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2165 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2165 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2165 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56513] VGAM2182 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2182 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2182 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2182 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56514] VGAM2243 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2243 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2243 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2243 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56515] VGAM2456 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2456 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2456 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2456 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56516] VGAM3807 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3807 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3807 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3807 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56517] It is appreciated that a function of VGR4051 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4051 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4051 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4051 gene: VGAM2165 host target protein, VGAM2182 host target protein,

VGAM2243 host target protein, VGAM2456 host target protein and VGAM3807 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2165, VGAM2182, VGAM2243, VGAM2456 and VGAM3807

[56518] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4052(VGR4052) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56519] VGR4052 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4052 gene was detected is described hereinabove with reference to Figs. 6-15.

[56520] VGR4052 gene encodes VGR4052 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56521] VGR4052 precursor RNA folds spatially, forming VGR4052 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4052 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4052 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56522] VGR4052 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2547 precursor RNA, VGAM2548 precursor RNA, VGAM2549 precursor RNA and VGAM2550 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56523] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2547 RNA, VGAM2548 RNA, VGAM2549 RNA and VGAM2550 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56524] VGAM2547 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2547 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2547 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2547 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56525] VGAM2548 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2548 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2548 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2548 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56526] VGAM2549 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2549 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2549 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2549 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56527] VGAM2550 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2550 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2550 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2550 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56528] It is appreciated that a function of VGR4052 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4052 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4052 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4052 gene: VGAM2547 host target protein, VGAM2548 host target protein, VGAM2549 host target protein and VGAM2550 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN

respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2547, VGAM2548, VGAM2549 and VGAM2550

[56529] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4053(VGR4053) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56530] VGR4053 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4053 gene was detected is described hereinabove with reference to Figs. 6–15.

[56531] VGR4053 gene encodes VGR4053 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56532] VGR4053 precursor RNA folds spatially, forming VGR4053 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4053 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4053 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56533] VGR4053 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2540 precursor RNA and VGAM3142 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56534] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2540 RNA and VGAM3142 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56535] VGAM2540 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2540 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2540 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2540 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56536] VGAM3142 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3142 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3142 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3142 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[56537] It is appreciated that a function of VGR4053 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4053 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4053 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4053 gene: VGAM2540 host target protein and VGAM3142 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2540 and VGAM3142

[56538] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4054(VGR4054) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[56539] VGR4054 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4054 gene was detected is described hereinabove with reference to Figs. 6–15.

[56540] VGR4054 gene encodes VGR4054 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56541] VGR4054 precursor RNA folds spatially, forming VGR4054 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4054 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4054 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56542] VGR4054 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM pre–

cursor RNAs, VGAM491 precursor RNA, VGAM494 precursor RNA, VGAM495 precursor RNA and VGAM3607 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56543] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM491 RNA, VGAM494 RNA, VGAM495 RNA and VGAM3607 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56544] VGAM491 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM491 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM491 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM491 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56545] VGAM494 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM494 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM494 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM494 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56546] VGAM495 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM495 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM495 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM495 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56547] VGAM3607 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3607 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3607 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3607 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56548] It is appreciated that a function of VGR4054 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4054 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4054

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4054 gene: VGAM491 host target protein, VGAM494 host target protein, VGAM495 host target protein and VGAM3607 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM491, VGAM494, VGAM495 and VGAM3607

[56549] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4055(VGR4055) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56550] VGR4055 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4055 gene was detected is described hereinabove with reference to Figs.

6-15.

[56551] VGR4055 gene encodes VGR4055 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56552] VGR4055 precursor RNA folds spatially, forming VGR4055 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4055 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4055 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56553] VGR4055 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2503 precursor RNA, VGAM2504 precursor RNA, VGAM2505 precursor RNA, VGAM3047 precursor RNA and VGAM3622 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and

VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56554] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2503 RNA, VGAM2504 RNA, VGAM2505 RNA, VGAM3047 RNA and VGAM3622 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56555] VGAM2503 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2503 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2503 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2503 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56556] VGAM2504 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2504 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2504 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2504 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56557] VGAM2505 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2505 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2505 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2505 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[56558] VGAM3047 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3047 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3047 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3047 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56559] VGAM3622 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3622 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3622 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3622 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56560] It is appreciated that a function of VGR4055 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4055 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4055 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4055 gene: VGAM2503 host target protein, VGAM2504 host target protein, VGAM2505 host target protein, VGAM3047 host target protein and VGAM3622 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2503, VGAM2504, VGAM2505, VGAM3047 and VGAM3622

[56561] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4056(VGR4056) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56562] VGR4056 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4056 gene was detected is described hereinabove with reference to Figs. 6–15.

[56563] VGR4056 gene encodes VGR4056 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56564] VGR4056 precursor RNA folds spatially, forming VGR4056 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4056 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4056 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[56565] VGR4056 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1307 precursor RNA, VGAM1308 precursor RNA, VGAM1309 precursor RNA, VGAM1310 precursor RNA, VGAM1337 precursor RNA, VGAM1339 precursor RNA, VGAM2630 precursor RNA and VGAM2631 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56566] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1307 RNA, VGAM1308 RNA, VGAM1309 RNA, VGAM1310 RNA, VGAM1337 RNA, VGAM1339 RNA, VGAM2630 RNA and VGAM2631 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56567] VGAM1307 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1307 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1307 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1307 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56568] VGAM1308 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1308 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1308 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1308 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56569] VGAM1309 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1309 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1309 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1309 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56570] VGAM1310 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1310 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1310 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1310 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56571] VGAM1337 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1337 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1337 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1337 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56572] VGAM1339 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1339 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1339 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1339 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56573] VGAM2630 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2630 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2630 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2630 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56574] VGAM2631 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2631 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2631 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2631 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56575] It is appreciated that a function of VGR4056 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4056 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4056 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4056 gene: VGAM1307 host target protein, VGAM1308 host target protein, VGAM1309 host target protein, VGAM1310 host target protein, VGAM1337 host target protein, VGAM1339 host target protein, VGAM2630 host target protein and VGAM2631 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1307, VGAM1308, VGAM1309, VGAM1310, VGAM1337, VGAM1339, VGAM2630 and VGAM2631

[56576] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4057(VGR4057) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56577] VGR4057 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4057 gene was detected is described hereinabove with reference to Figs. 6–15.

[56578] VGR4057 gene encodes VGR4057 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56579] VGR4057 precursor RNA folds spatially, forming VGR4057 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4057 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4057 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56580] VGR4057 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2771 precursor RNA, VGAM3119 precursor RNA and VGAM3180 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56581] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2771 RNA, VGAM3119 RNA and VGAM3180 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2

RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56582] VGAM2771 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2771 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2771 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2771 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56583] VGAM3119 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3119 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3119 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM3119 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56584] VGAM3180 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3180 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3180 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3180 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56585] It is appreciated that a function of VGR4057 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4057 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4057 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4057 gene: VGAM2771 host target protein, VGAM3119 host target protein and VGAM3180 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2771, VGAM3119 and VGAM3180

[56586] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4058(VGR4058) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56587] VGR4058 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4058 gene was detected is described hereinabove with reference to Figs. 6–15.

[56588] VGR4058 gene encodes VGR4058 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[56589] VGR4058 precursor RNA folds spatially, forming VGR4058 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4058 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4058 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56590] VGR4058 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1315 precursor RNA, VGAM2350 precursor RNA, VGAM2351 precursor RNA, VGAM2449 precursor RNA, VGAM2514 precursor RNA, VGAM2749 precursor RNA and VGAM3651 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56591] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1315 RNA, VGAM2350 RNA, VGAM2351 RNA, VGAM2449 RNA, VGAM2514 RNA, VGAM2749 RNA and VGAM3651 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56592] VGAM1315 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1315 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1315 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1315 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56593] VGAM2350 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2350 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2350 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2350 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56594] VGAM2351 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2351 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2351 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2351 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[56595] VGAM2449 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2449 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2449 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2449 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56596] VGAM2514 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2514 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2514 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2514 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56597] VGAM2749 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2749 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2749 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2749 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56598] VGAM3651 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3651 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3651 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM3651 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56599] It is appreciated that a function of VGR4058 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4058 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4058 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4058 gene: VGAM1315 host target protein, VGAM2350 host target protein, VGAM2351 host target protein, VGAM2449 host target protein, VGAM2514 host target protein, VGAM2749 host target protein and VGAM3651 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1315, VGAM2350, VGAM2351, VGAM2449, VGAM2514, VGAM2749 and VGAM3651

[56600] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4059(VGR4059) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56601] VGR4059 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4059 gene was detected is described hereinabove with reference to Figs. 6–15.

[56602] VGR4059 gene encodes VGR4059 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56603] VGR4059 precursor RNA folds spatially, forming VGR4059 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4059 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4059 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56604] VGR4059 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1121 precursor RNA, VGAM2186 precursor RNA, VGAM2781 precursor RNA, VGAM3022 precursor RNA, VGAM3023 precursor RNA, VGAM3498 precursor RNA and VGAM3650 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56605] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1121 RNA, VGAM2186 RNA, VGAM2781 RNA, VGAM3022 RNA, VGAM3023 RNA, VGAM3498 RNA and VGAM3650 RNA respectively, herein schematically represented by VGAM1

RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56606] VGAM1121 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1121 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1121 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1121 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56607] VGAM2186 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2186 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2186 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM2186 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56608] VGAM2781 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2781 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2781 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2781 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56609] VGAM3022 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3022 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3022 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3022 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56610] VGAM3023 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3023 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3023 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3023 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56611] VGAM3498 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3498 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3498 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3498 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56612] VGAM3650 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3650 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3650 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3650 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56613] It is appreciated that a function of VGR4059 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4059 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4059 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4059 gene: VGAM1121 host target protein, VGAM2186 host target protein, VGAM2781 host target protein, VGAM3022 host target protein, VGAM3023 host target protein, VGAM3498 host target protein and VGAM3650 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1121, VGAM2186, VGAM2781, VGAM3022, VGAM3023, VGAM3498 and VGAM3650

[56614] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4060(VGR4060) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56615] VGR4060 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4060 gene was detected is described hereinabove with reference to Figs. 6–15.

[56616] VGR4060 gene encodes VGR4060 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56617] VGR4060 precursor RNA folds spatially, forming VGR4060 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4060 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4060 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56618] VGR4060 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1436 precursor RNA, VGAM2188 pre–

cursor RNA, VGAM2190 precursor RNA, VGAM2555 precursor RNA, VGAM2556 precursor RNA, VGAM2676 precursor RNA and VGAM2727 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56619] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1436 RNA, VGAM2188 RNA, VGAM2190 RNA, VGAM2555 RNA, VGAM2556 RNA, VGAM2676 RNA and VGAM2727 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56620] VGAM1436 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1436 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1436 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1436 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56621] VGAM2188 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2188 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2188 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2188 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56622] VGAM2190 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2190 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2190 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2190 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56623] VGAM2555 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2555 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2555 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2555 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56624] VGAM2556 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2556 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2556 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2556 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56625] VGAM2676 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2676 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2676 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2676 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56626] VGAM2727 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM2727 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2727 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2727 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56627] It is appreciated that a function of VGR4060 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4060 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4060 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4060 gene: VGAM1436 host target protein, VGAM2188 host target protein, VGAM2190 host target protein, VGAM2555 host target protein, VGAM2556 host target protein, VGAM2676 host

target protein and VGAM2727 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1436, VGAM2188, VGAM2190, VGAM2555, VGAM2556, VGAM2676 and VGAM2727

[56628] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4061(VGR4061) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56629] VGR4061 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4061 gene was detected is described hereinabove with reference to Figs. 6-15.

[56630] VGR4061 gene encodes VGR4061 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56631] VGR4061 precursor RNA folds spatially, forming VGR4061 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4061 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4061 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56632] VGR4061 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2808 precursor RNA and VGAM3021 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56633] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2808

RNA and VGAM3021 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56634] VGAM2808 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2808 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2808 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2808 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56635] VGAM3021 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3021 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3021 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3021 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [56636] It is appreciated that a function of VGR4061 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4061 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4061 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4061 gene: VGAM2808 host target protein and VGAM3021 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2808 and VGAM3021
- [56637] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4062(VGR4062) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56638] VGR4062 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4062 gene was detected is described hereinabove with reference to Figs. 6–15.

[56639] VGR4062 gene encodes VGR4062 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56640] VGR4062 precursor RNA folds spatially, forming VGR4062 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4062 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4062 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[56641] VGR4062 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM465 precursor RNA, VGAM466 precursor RNA, VGAM923 precursor RNA, VGAM924 precursor RNA, VGAM1122 precursor RNA, VGAM1124 precursor RNA, VGAM1125 precursor RNA and VGAM1236 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56642] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM465 RNA, VGAM466 RNA, VGAM923 RNA, VGAM924 RNA, VGAM1122 RNA, VGAM1124 RNA, VGAM1125 RNA and VGAM1236 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56643] VGAM465 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM465 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM465 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM465 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56644] VGAM466 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM466 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM466 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM466 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56645] VGAM923 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM923 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM923 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM923 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56646] VGAM924 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM924 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM924 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM924 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56647] VGAM1122 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1122 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1122 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1122 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56648] VGAM1124 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1124 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1124 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1124 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56649] VGAM1125 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1125 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1125 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1125 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56650] VGAM1236 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1236 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1236 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1236 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56651] It is appreciated that a function of VGR4062 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4062 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4062 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4062 gene: VGAM465 host target protein, VGAM466 host target protein, VGAM923 host target protein, VGAM924 host target protein, VGAM1122 host target protein, VGAM1124 host target protein, VGAM1125 host target protein and VGAM1236 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host tar-

get genes is elaborated hereinabove with reference to VGAM465, VGAM466, VGAM923, VGAM924, VGAM1122, VGAM1124, VGAM1125 and VGAM1236

[56652] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4063(VGR4063) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56653] VGR4063 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4063 gene was detected is described hereinabove with reference to Figs. 6–15.

[56654] VGR4063 gene encodes VGR4063 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56655] VGR4063 precursor RNA folds spatially, forming VGR4063 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4063 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4063 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56656] VGR4063 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1242 precursor RNA, VGAM1417 precursor RNA, VGAM1420 precursor RNA, VGAM1424 precursor RNA, VGAM1425 precursor RNA, VGAM1969 precursor RNA, VGAM2059 precursor RNA and VGAM2446 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56657] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1242 RNA, VGAM1417 RNA, VGAM1420 RNA, VGAM1424 RNA, VGAM1425 RNA, VGAM1969 RNA, VGAM2059 RNA and VGAM2446 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56658] VGAM1242 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1242 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1242 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1242 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56659] VGAM1417 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1417 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1417 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1417 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56660] VGAM1420 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1420 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1420 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1420 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56661] VGAM1424 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM1424 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1424 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1424 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56662] VGAM1425 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1425 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1425 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1425 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56663] VGAM1969 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1969 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1969 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1969 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56664] VGAM2059 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2059 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2059 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2059 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56665] VGAM2446 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2446 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2446 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2446 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56666] It is appreciated that a function of VGR4063 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4063 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4063 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4063 gene: VGAM1242 host target protein, VGAM1417 host target protein,

VGAM1420 host target protein, VGAM1424 host target protein, VGAM1425 host target protein, VGAM1969 host target protein, VGAM2059 host target protein and VGAM2446 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1242, VGAM1417, VGAM1420, VGAM1424, VGAM1425, VGAM1969, VGAM2059 and VGAM2446

[56667] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4064(VGR4064) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56668] VGR4064 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4064 gene was detected is described hereinabove with reference to Figs. 6-15.

- [56669] VGR4064 gene encodes VGR4064 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.
- [56670] VGR4064 precursor RNA folds spatially, forming VGR4064 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4064 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4064 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.
- [56671] VGR4064 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2447 precursor RNA, VGAM2448 precursor RNA and VGAM2469 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig.

8.

[56672] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2447 RNA, VGAM2448 RNA and VGAM2469 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56673] VGAM2447 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2447 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2447 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2447 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56674] VGAM2448 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2448 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2448 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2448 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56675] VGAM2469 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2469 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2469 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2469 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56676] It is appreciated that a function of VGR4064 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4064 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4064 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4064 gene: VGAM2447 host target protein, VGAM2448 host target protein and VGAM2469 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2447, VGAM2448 and VGAM2469

[56677] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4065(VGR4065) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56678] VGR4065 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4065 gene was detected is described hereinabove with reference to Figs. 6–15.

[56679] VGR4065 gene encodes VGR4065 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56680] VGR4065 precursor RNA folds spatially, forming VGR4065 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4065 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4065 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56681] VGR4065 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM783 precursor RNA, VGAM786 precursor RNA, VGAM787 precursor RNA, VGAM788 precursor

RNA, VGAM790 precursor RNA, VGAM1477 precursor RNA, VGAM1479 precursor RNA and VGAM1480 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56682] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM783 RNA, VGAM786 RNA, VGAM787 RNA, VGAM788 RNA, VGAM790 RNA, VGAM1477 RNA, VGAM1479 RNA and VGAM1480 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56683] VGAM783 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM783 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM783 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM783 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56684] VGAM786 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM786 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM786 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM786 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56685] VGAM787 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM787 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM787 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM787 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56686] VGAM788 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM788 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM788 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM788 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56687] VGAM790 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM790 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM790 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM790 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56688] VGAM1477 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1477 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1477 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1477 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56689] VGAM1479 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1479 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1479 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1479 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56690] VGAM1480 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1480 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1480 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1480 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56691] It is appreciated that a function of VGR4065 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4065 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4065 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4065 gene: VGAM783 host target protein, VGAM786 host target protein, VGAM787 host target protein, VGAM788 host target protein, VGAM790 host target protein, VGAM1477 host target protein, VGAM1479 host target protein and VGAM1480 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM783, VGAM786, VGAM787, VGAM788, VGAM790, VGAM1477, VGAM1479 and VGAM1480

[56692] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4066(VGR4066) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56693] VGR4066 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4066 gene was detected is described hereinabove with reference to Figs. 6–15.

[56694] VGR4066 gene encodes VGR4066 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56695] VGR4066 precursor RNA folds spatially, forming VGR4066 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4066 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4066 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[56696] VGR4066 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1486 precursor RNA and VGAM3776 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56697] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1486 RNA and VGAM3776 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56698] VGAM1486 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1486 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1486 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1486 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56699] VGAM3776 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3776 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3776 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3776 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56700] It is appreciated that a function of VGR4066 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4066 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4066 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4066 gene: VGAM1486 host target protein and VGAM3776 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1486 and VGAM3776

[56701] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4067(VGR4067) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56702] VGR4067 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4067 gene was detected is described hereinabove with reference to Figs. 6–15.

- [56703] VGR4067 gene encodes VGR4067 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.
- [56704] VGR4067 precursor RNA folds spatially, forming VGR4067 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4067 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4067 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.
- [56705] VGR4067 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1546 precursor RNA and VGAM1549 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56706] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1546 RNA and VGAM1549 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56707] VGAM1546 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1546 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1546 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1546 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56708] VGAM1549 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1549 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1549 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1549 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56709] It is appreciated that a function of VGR4067 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4067 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4067 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4067 gene: VGAM1546 host target protein and VGAM1549 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1546 and VGAM1549

[56710] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4068(VGR4068) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56711] VGR4068 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4068 gene was detected is described hereinabove with reference to Figs. 6–15.

[56712] VGR4068 gene encodes VGR4068 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56713] VGR4068 precursor RNA folds spatially, forming VGR4068 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4068 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4068 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56714] VGR4068 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2724 precursor RNA, VGAM2920 precursor RNA, VGAM2921 precursor RNA and VGAM2922 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56715] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2724 RNA, VGAM2920 RNA, VGAM2921 RNA and VGAM2922 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56716] VGAM2724 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2724 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2724 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2724 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56717] VGAM2920 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2920 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2920 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2920 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[56718] VGAM2921 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2921 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2921 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2921 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56719] VGAM2922 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2922 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2922 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2922 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56720] It is appreciated that a function of VGR4068 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4068 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4068 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4068 gene: VGAM2724 host target protein, VGAM2920 host target protein, VGAM2921 host target protein and VGAM2922 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2724, VGAM2920, VGAM2921 and VGAM2922

[56721] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4069(VGR4069) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56722] VGR4069 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4069 gene was detected is described hereinabove with reference to Figs. 6–15.

[56723] VGR4069 gene encodes VGR4069 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56724] VGR4069 precursor RNA folds spatially, forming VGR4069 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4069 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4069 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56725] VGR4069 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2055 precursor RNA and VGAM2057 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56726] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2055 RNA and VGAM2057 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56727] VGAM2055 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2055 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2055 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2055 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56728] VGAM2057 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2057 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2057 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2057 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56729] It is appreciated that a function of VGR4069 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4069 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4069

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4069 gene: VGAM2055 host target protein and VGAM2057 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2055 and VGAM2057

[56730] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4070(VGR4070) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56731] VGR4070 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4070 gene was detected is described hereinabove with reference to Figs. 6-15.

[56732] VGR4070 gene encodes VGR4070 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56733] VGR4070 precursor RNA folds spatially, forming VGR4070 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4070 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4070 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56734] VGR4070 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM497 precursor RNA, VGAM538 precursor RNA, VGAM541 precursor RNA, VGAM542 precursor RNA, VGAM1325 precursor RNA, VGAM1516 precursor RNA, VGAM1517 precursor RNA and VGAM1523 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRE-

CURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56735] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM497 RNA, VGAM538 RNA, VGAM541 RNA, VGAM542 RNA, VGAM1325 RNA, VGAM1516 RNA, VGAM1517 RNA and VGAM1523 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56736] VGAM497 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM497 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM497 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM497 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56737] VGAM538 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM538 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM538 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM538 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56738] VGAM541 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM541 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM541 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM541 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56739] VGAM542 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM542 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM542 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM542 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56740] VGAM1325 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1325 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1325 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1325 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56741] VGAM1516 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1516 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1516 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1516 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56742] VGAM1517 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1517 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1517 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1517 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56743] VGAM1523 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1523 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1523 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1523 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56744] It is appreciated that a function of VGR4070 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4070 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4070 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4070 gene: VGAM497 host target protein, VGAM538 host target protein, VGAM541 host target protein, VGAM542 host target protein, VGAM1325 host target protein, VGAM1516 host target protein, VGAM1517 host target protein and VGAM1523 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM497, VGAM538, VGAM541, VGAM542, VGAM1325, VGAM1516, VGAM1517 and VGAM1523

[56745] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4071(VGR4071) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56746] VGR4071 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4071 gene was detected is described hereinabove with reference to Figs. 6–15.

[56747] VGR4071 gene encodes VGR4071 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56748] VGR4071 precursor RNA folds spatially, forming VGR4071 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4071 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4071 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56749] VGR4071 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1936 precursor RNA and VGAM1938

precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56750] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1936 RNA and VGAM1938 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56751] VGAM1936 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1936 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1936 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1936 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[56752] VGAM1938 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1938 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1938 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1938 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56753] It is appreciated that a function of VGR4071 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4071 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4071 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4071 gene: VGAM1936

host target protein and VGAM1938 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM1936 and VGAM1938

[56754] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4072(VGR4072) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56755] VGR4072 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4072 gene was detected is described hereinabove with reference to Figs. 6–15.

[56756] VGR4072 gene encodes VGR4072 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56757] VGR4072 precursor RNA folds spatially, forming VGR4072 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4072 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4072 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56758] VGR4072 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM510 precursor RNA, VGAM511 precursor RNA, VGAM512 precursor RNA, VGAM513 precursor RNA, VGAM544 precursor RNA, VGAM546 precursor RNA, VGAM547 precursor RNA and VGAM909 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56759] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM510 RNA, VGAM511 RNA, VGAM512 RNA, VGAM513 RNA, VGAM544 RNA, VGAM546 RNA, VGAM547 RNA and VGAM909 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56760] VGAM510 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM510 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM510 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM510 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56761] VGAM511 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM511 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM511 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM511 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56762] VGAM512 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM512 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM512 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM512 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56763] VGAM513 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM513 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM513 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM513 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56764] VGAM544 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM544 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM544 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM544 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[56765] VGAM546 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM546 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM546 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM546 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56766] VGAM547 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM547 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM547 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM547 host target protein, herein schematically

represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56767] VGAM909 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM909 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM909 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM909 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56768] It is appreciated that a function of VGR4072 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4072 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4072 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4072 gene: VGAM510 host target protein, VGAM511 host target protein, VGAM512 host target protein, VGAM513 host target protein, VGAM544 host target protein, VGAM546 host target protein, VGAM547 host target protein and VGAM909 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM510, VGAM511, VGAM512, VGAM513, VGAM544, VGAM546, VGAM547 and VGAM909

[56769] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4073(VGR4073) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56770] VGR4073 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4073 gene was detected is described hereinabove with reference to Figs.

6-15.

[56771] VGR4073 gene encodes VGR4073 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56772] VGR4073 precursor RNA folds spatially, forming VGR4073 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4073 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4073 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56773] VGR4073 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM911 precursor RNA, VGAM929 precursor RNA, VGAM947 precursor RNA, VGAM1268 precursor RNA, VGAM1269 precursor RNA, VGAM1658 precursor RNA, VGAM1674 precursor RNA and VGAM1709 precursor RNA, herein schematically represented by VGAM1 PRE-

CURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56774] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM911 RNA, VGAM929 RNA, VGAM947 RNA, VGAM1268 RNA, VGAM1269 RNA, VGAM1658 RNA, VGAM1674 RNA and VGAM1709 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56775] VGAM911 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM911 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM911 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM911 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56776] VGAM929 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM929 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM929 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM929 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56777] VGAM947 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM947 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM947 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM947 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56778] VGAM1268 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1268 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1268 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1268 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56779] VGAM1269 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1269 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1269 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1269 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56780] VGAM1658 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1658 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1658 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1658 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56781] VGAM1674 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1674 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1674 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1674 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56782] VGAM1709 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1709 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1709 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1709 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56783] It is appreciated that a function of VGR4073 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4073 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4073 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4073 gene: VGAM911 host target protein, VGAM929 host target protein, VGAM947 host target protein, VGAM1268 host target protein, VGAM1269 host target protein, VGAM1658 host target protein, VGAM1674 host target protein and VGAM1709 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM911, VGAM929, VGAM947, VGAM1268, VGAM1269, VGAM1658, VGAM1674 and VGAM1709

[56784] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4074(VGR4074) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[56785] VGR4074 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4074 gene was detected is described hereinabove with reference to Figs. 6–15.

[56786] VGR4074 gene encodes VGR4074 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56787] VGR4074 precursor RNA folds spatially, forming VGR4074 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4074 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4074 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56788] VGR4074 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1712 precursor RNA, VGAM1854 precursor RNA, VGAM1856 precursor RNA, VGAM1901 precursor RNA, VGAM1902 precursor RNA, VGAM1903 precursor RNA, VGAM1904 precursor RNA and VGAM2360 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56789] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1712 RNA, VGAM1854 RNA, VGAM1856 RNA, VGAM1901 RNA, VGAM1902 RNA, VGAM1903 RNA, VGAM1904 RNA and VGAM2360 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56790] VGAM1712 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1712 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1712 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1712 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56791] VGAM1854 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1854 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1854 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1854 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56792] VGAM1856 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1856 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1856 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1856 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56793] VGAM1901 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1901 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1901 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1901 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[56794] VGAM1902 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1902 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1902 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1902 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56795] VGAM1903 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1903 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1903 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1903 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56796] VGAM1904 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1904 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1904 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1904 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56797] VGAM2360 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2360 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2360 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM2360 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56798] It is appreciated that a function of VGR4074 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4074 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4074 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4074 gene: VGAM1712 host target protein, VGAM1854 host target protein, VGAM1856 host target protein, VGAM1901 host target protein, VGAM1902 host target protein, VGAM1903 host target protein, VGAM1904 host target protein and VGAM2360 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1712, VGAM1854, VGAM1856, VGAM1901, VGAM1902, VGAM1903, VGAM1904 and

VGAM2360

[56799] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4075(VGR4075) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56800] VGR4075 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4075 gene was detected is described hereinabove with reference to Figs. 6–15.

[56801] VGR4075 gene encodes VGR4075 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56802] VGR4075 precursor RNA folds spatially, forming VGR4075 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4075 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4075 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56803] VGR4075 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2361 precursor RNA, VGAM2362 precursor RNA, VGAM2363 precursor RNA, VGAM2458 precursor RNA, VGAM2595 precursor RNA, VGAM2600 precursor RNA, VGAM2612 precursor RNA and VGAM2613 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56804] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2361 RNA, VGAM2362 RNA, VGAM2363 RNA, VGAM2458 RNA,

VGAM2595 RNA, VGAM2600 RNA, VGAM2612 RNA and VGAM2613 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56805] VGAM2361 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2361 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2361 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2361 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56806] VGAM2362 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2362 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2362 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2362 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56807] VGAM2363 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2363 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2363 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2363 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56808] VGAM2458 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2458 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2458 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2458 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56809] VGAM2595 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2595 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2595 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2595 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56810] VGAM2600 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2600 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2600 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2600 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56811] VGAM2612 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2612 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2612 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2612 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56812] VGAM2613 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM2613 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2613 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2613 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56813] It is appreciated that a function of VGR4075 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4075 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4075 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4075 gene: VGAM2361 host target protein, VGAM2362 host target protein, VGAM2363 host target protein, VGAM2458 host target protein, VGAM2595 host target protein, VGAM2600 host

target protein, VGAM2612 host target protein and VGAM2613 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2361, VGAM2362, VGAM2363, VGAM2458, VGAM2595, VGAM2600, VGAM2612 and VGAM2613

[56814] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4076(VGR4076) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56815] VGR4076 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4076 gene was detected is described hereinabove with reference to Figs. 6–15.

[56816] VGR4076 gene encodes VGR4076 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[56817] VGR4076 precursor RNA folds spatially, forming VGR4076 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4076 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4076 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56818] VGR4076 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2614 precursor RNA, VGAM2615 precursor RNA, VGAM2667 precursor RNA, VGAM2668 precursor RNA, VGAM2707 precursor RNA, VGAM2846 precursor RNA, VGAM2995 precursor RNA and VGAM2996 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRE-

CURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56819] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2614 RNA, VGAM2615 RNA, VGAM2667 RNA, VGAM2668 RNA, VGAM2707 RNA, VGAM2846 RNA, VGAM2995 RNA and VGAM2996 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56820] VGAM2614 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2614 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2614 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2614 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56821] VGAM2615 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2615 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2615 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2615 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56822] VGAM2667 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2667 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2667 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM2667 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56823] VGAM2668 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2668 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2668 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2668 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56824] VGAM2707 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2707 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2707 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM2707 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56825] VGAM2846 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2846 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2846 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2846 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56826] VGAM2995 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2995 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2995 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2995 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56827] VGAM2996 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2996 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2996 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2996 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56828] It is appreciated that a function of VGR4076 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4076 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4076

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4076 gene: VGAM2614 host target protein, VGAM2615 host target protein, VGAM2667 host target protein, VGAM2668 host target protein, VGAM2707 host target protein, VGAM2846 host target protein, VGAM2995 host target protein and VGAM2996 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2614, VGAM2615, VGAM2667, VGAM2668, VGAM2707, VGAM2846, VGAM2995 and VGAM2996

[56829] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4077(VGR4077) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56830] VGR4077 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4077 gene was detected is described hereinabove with reference to Figs. 6–15.

[56831] VGR4077 gene encodes VGR4077 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56832] VGR4077 precursor RNA folds spatially, forming VGR4077 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4077 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4077 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56833] VGR4077 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3099 precursor RNA, VGAM3189 pre–

cursor RNA, VGAM3190 precursor RNA, VGAM3206 precursor RNA, VGAM3280 precursor RNA, VGAM3347 precursor RNA, VGAM3380 precursor RNA and VGAM3460 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56834] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3099 RNA, VGAM3189 RNA, VGAM3190 RNA, VGAM3206 RNA, VGAM3280 RNA, VGAM3347 RNA, VGAM3380 RNA and VGAM3460 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56835] VGAM3099 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3099 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3099 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3099 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56836] VGAM3189 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3189 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3189 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3189 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56837] VGAM3190 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM3190 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3190 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3190 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56838] VGAM3206 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3206 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3206 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3206 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56839] VGAM3280 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3280 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3280 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3280 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56840] VGAM3347 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3347 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3347 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3347 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56841] VGAM3380 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3380 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3380 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3380 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56842] VGAM3460 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3460 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3460 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3460 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[56843] It is appreciated that a function of VGR4077 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4077 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4077 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4077 gene: VGAM3099 host target protein, VGAM3189 host target protein, VGAM3190 host target protein, VGAM3206 host target protein, VGAM3280 host target protein, VGAM3347 host target protein, VGAM3380 host target protein and VGAM3460 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3099, VGAM3189, VGAM3190, VGAM3206, VGAM3280, VGAM3347, VGAM3380 and VGAM3460

[56844] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4078(VGR4078) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56845] VGR4078 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4078 gene was detected is described hereinabove with reference to Figs. 6–15.

[56846] VGR4078 gene encodes VGR4078 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56847] VGR4078 precursor RNA folds spatially, forming VGR4078 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4078 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4078 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56848] VGR4078 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM3471 precursor RNA, VGAM3546 precursor RNA, VGAM3641 precursor RNA, VGAM3649 precursor RNA, VGAM3666 precursor RNA, VGAM3696 precursor RNA and VGAM3715 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56849] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3471 RNA, VGAM3546 RNA, VGAM3641 RNA, VGAM3649 RNA, VGAM3666 RNA, VGAM3696 RNA and VGAM3715 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5

RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56850] VGAM3471 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3471 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3471 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3471 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56851] VGAM3546 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3546 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3546 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM3546 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56852] VGAM3641 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3641 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3641 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3641 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56853] VGAM3649 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3649 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3649 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM3649 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56854] VGAM3666 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3666 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3666 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3666 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56855] VGAM3696 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3696 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3696 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3696 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56856] VGAM3715 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3715 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3715 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3715 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56857] It is appreciated that a function of VGR4078 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4078 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4078

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4078 gene: VGAM3471 host target protein, VGAM3546 host target protein, VGAM3641 host target protein, VGAM3649 host target protein, VGAM3666 host target protein, VGAM3696 host target protein and VGAM3715 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3471, VGAM3546, VGAM3641, VGAM3649, VGAM3666, VGAM3696 and VGAM3715

[56858] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4079(VGR4079) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56859] VGR4079 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4079 gene was detected is described hereinabove with reference to Figs. 6–15.

[56860] VGR4079 gene encodes VGR4079 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56861] VGR4079 precursor RNA folds spatially, forming VGR4079 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4079 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4079 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56862] VGR4079 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM394 precursor RNA, VGAM396 precursor RNA, VGAM397 precursor RNA, VGAM398 precursor

RNA, VGAM399 precursor RNA, VGAM400 precursor RNA, VGAM530 precursor RNA and VGAM622 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56863] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM394 RNA, VGAM396 RNA, VGAM397 RNA, VGAM398 RNA, VGAM399 RNA, VGAM400 RNA, VGAM530 RNA and VGAM622 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56864] VGAM394 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM394 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM394 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM394 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56865] VGAM396 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM396 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM396 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM396 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56866] VGAM397 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM397 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM397 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM397 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56867] VGAM398 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM398 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM398 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM398 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56868] VGAM399 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM399 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM399 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM399 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56869] VGAM400 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM400 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM400 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM400 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56870] VGAM530 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM530 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM530 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM530 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56871] VGAM622 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM622 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM622 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM622 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56872] It is appreciated that a function of VGR4079 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4079 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4079 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4079 gene: VGAM394 host target protein, VGAM396 host target protein, VGAM397 host target protein, VGAM398 host target protein, VGAM399 host target protein, VGAM400 host target protein, VGAM530 host target protein and VGAM622 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM394, VGAM396, VGAM397, VGAM398, VGAM399, VGAM400, VGAM530 and VGAM622

[56873] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4080(VGR4080) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56874] VGR4080 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4080 gene was detected is described hereinabove with reference to Figs. 6–15.

[56875] VGR4080 gene encodes VGR4080 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56876] VGR4080 precursor RNA folds spatially, forming VGR4080 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4080 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4080 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[56877] VGR4080 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM652 precursor RNA, VGAM709 precursor RNA, VGAM712 precursor RNA, VGAM970 precursor RNA, VGAM986 precursor RNA, VGAM1632 precursor RNA, VGAM1634 precursor RNA and VGAM1672 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56878] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM652 RNA, VGAM709 RNA, VGAM712 RNA, VGAM970 RNA, VGAM986 RNA, VGAM1632 RNA, VGAM1634 RNA and VGAM1672 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56879] VGAM652 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM652 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM652 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM652 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56880] VGAM709 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM709 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM709 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM709 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56881] VGAM712 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM712 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM712 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM712 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56882] VGAM970 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM970 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM970 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM970 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56883] VGAM986 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM986 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM986 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM986 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56884] VGAM1632 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1632 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1632 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1632 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56885] VGAM1634 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1634 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1634 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1634 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56886] VGAM1672 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1672 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1672 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1672 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56887] It is appreciated that a function of VGR4080 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4080 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4080 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4080 gene: VGAM652 host target protein, VGAM709 host target protein, VGAM712 host target protein, VGAM970 host target protein, VGAM986 host target protein, VGAM1632 host target protein, VGAM1634 host target protein and VGAM1672 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host tar-

get genes is elaborated hereinabove with reference to VGAM652, VGAM709, VGAM712, VGAM970, VGAM986, VGAM1632, VGAM1634 and VGAM1672

[56888] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4081(VGR4081) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56889] VGR4081 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4081 gene was detected is described hereinabove with reference to Figs. 6–15.

[56890] VGR4081 gene encodes VGR4081 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56891] VGR4081 precursor RNA folds spatially, forming VGR4081 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4081 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4081 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56892] VGR4081 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1675 precursor RNA, VGAM2297 precursor RNA, VGAM2298 precursor RNA, VGAM2584 precursor RNA, VGAM2654 precursor RNA, VGAM2677 precursor RNA, VGAM2726 precursor RNA and VGAM2782 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56893] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1675 RNA, VGAM2297 RNA, VGAM2298 RNA, VGAM2584 RNA, VGAM2654 RNA, VGAM2677 RNA, VGAM2726 RNA and VGAM2782 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56894] VGAM1675 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1675 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1675 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1675 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56895] VGAM2297 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2297 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2297 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2297 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56896] VGAM2298 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2298 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2298 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2298 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56897] VGAM2584 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM2584 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2584 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2584 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56898] VGAM2654 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2654 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2654 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2654 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56899] VGAM2677 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2677 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2677 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2677 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56900] VGAM2726 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2726 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2726 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2726 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56901] VGAM2782 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2782 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2782 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2782 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56902] It is appreciated that a function of VGR4081 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4081 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4081 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4081 gene: VGAM1675 host target protein, VGAM2297 host target protein,

VGAM2298 host target protein, VGAM2584 host target protein, VGAM2654 host target protein, VGAM2677 host target protein, VGAM2726 host target protein and VGAM2782 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1675, VGAM2297, VGAM2298, VGAM2584, VGAM2654, VGAM2677, VGAM2726 and VGAM2782

[56903] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4082(VGR4082) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56904] VGR4082 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4082 gene was detected is described hereinabove with reference to Figs. 6-15.

[56905] VGR4082 gene encodes VGR4082 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56906] VGR4082 precursor RNA folds spatially, forming VGR4082 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4082 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4082 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56907] VGR4082 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2783 precursor RNA, VGAM2926 precursor RNA, VGAM3048 precursor RNA, VGAM3065 precursor RNA, VGAM3107 precursor RNA, VGAM3145 precursor RNA, VGAM3166 precursor RNA and VGAM3225 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56908] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2783 RNA, VGAM2926 RNA, VGAM3048 RNA, VGAM3065 RNA, VGAM3107 RNA, VGAM3145 RNA, VGAM3166 RNA and VGAM3225 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56909] VGAM2783 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2783 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2783 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2783 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56910] VGAM2926 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2926 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2926 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2926 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56911] VGAM3048 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3048 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3048 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3048 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56912] VGAM3065 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3065 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3065 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3065 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56913] VGAM3107 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3107 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3107 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3107 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56914] VGAM3145 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3145 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3145 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3145 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56915] VGAM3166 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3166 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3166 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3166 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56916] VGAM3225 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3225 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3225 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3225 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56917] It is appreciated that a function of VGR4082 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4082 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4082 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4082 gene: VGAM2783 host target protein, VGAM2926 host target protein, VGAM3048 host target protein, VGAM3065 host target protein, VGAM3107 host target protein, VGAM3145 host target protein, VGAM3166 host target protein and VGAM3225 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2783, VGAM2926, VGAM3048, VGAM3065, VGAM3107, VGAM3145, VGAM3166 and VGAM3225

[56918] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4083(VGR4083) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[56919] VGR4083 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4083 gene was detected is described hereinabove with reference to Figs. 6–15.

[56920] VGR4083 gene encodes VGR4083 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56921] VGR4083 precursor RNA folds spatially, forming VGR4083 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4083 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4083 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56922] VGR4083 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM3226 precursor RNA, VGAM3248 precursor RNA, VGAM3398 precursor RNA, VGAM3482 precursor RNA, VGAM3483 precursor RNA and VGAM3785 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56923] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3226 RNA, VGAM3248 RNA, VGAM3398 RNA, VGAM3482 RNA, VGAM3483 RNA and VGAM3785 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56924] VGAM3226 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3226 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3226 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3226 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56925] VGAM3248 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3248 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3248 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3248 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56926] VGAM3398 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3398 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3398 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3398 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56927] VGAM3482 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3482 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3482 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3482 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56928] VGAM3483 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM3483 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3483 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3483 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56929] VGAM3785 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3785 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3785 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3785 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56930] It is appreciated that a function of VGR4083 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4083 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4083 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4083 gene: VGAM3226 host target protein, VGAM3248 host target protein, VGAM3398 host target protein, VGAM3482 host target protein, VGAM3483 host target protein and VGAM3785 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3226, VGAM3248, VGAM3398, VGAM3482, VGAM3483 and VGAM3785

[56931] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4084(VGR4084) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56932] VGR4084 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4084 gene was detected is described hereinabove with reference to Figs. 6–15.

[56933] VGR4084 gene encodes VGR4084 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56934] VGR4084 precursor RNA folds spatially, forming VGR4084 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4084 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4084 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56935] VGR4084 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1040 precursor RNA, VGAM1041 precursor RNA, VGAM1243 precursor RNA, VGAM1700 precursor RNA, VGAM1703 precursor RNA, VGAM1704 precursor RNA and VGAM1705 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56936] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1040 RNA, VGAM1041 RNA, VGAM1243 RNA, VGAM1700 RNA, VGAM1703 RNA, VGAM1704 RNA and VGAM1705 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56937] VGAM1040 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM1040 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1040 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1040 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56938] VGAM1041 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1041 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1041 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1041 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56939] VGAM1243 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1243 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1243 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1243 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56940] VGAM1700 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1700 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1700 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1700 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56941] VGAM1703 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1703 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1703 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1703 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56942] VGAM1704 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1704 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1704 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1704 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[56943] VGAM1705 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1705 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1705 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1705 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56944] It is appreciated that a function of VGR4084 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4084 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4084 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4084 gene: VGAM1040

host target protein, VGAM1041 host target protein, VGAM1243 host target protein, VGAM1700 host target protein, VGAM1703 host target protein, VGAM1704 host target protein and VGAM1705 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1040, VGAM1041, VGAM1243, VGAM1700, VGAM1703, VGAM1704 and VGAM1705

[56945] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4085(VGR4085) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56946] VGR4085 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4085 gene was detected is described hereinabove with reference to Figs. 6-15.

[56947] VGR4085 gene encodes VGR4085 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56948] VGR4085 precursor RNA folds spatially, forming VGR4085 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4085 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4085 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56949] VGR4085 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3018 precursor RNA, VGAM3227 precursor RNA, VGAM3406 precursor RNA, VGAM3473 precursor RNA, VGAM3509 precursor RNA, VGAM3510 precursor RNA, VGAM3589 precursor RNA and VGAM3665 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56950] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3018 RNA, VGAM3227 RNA, VGAM3406 RNA, VGAM3473 RNA, VGAM3509 RNA, VGAM3510 RNA, VGAM3589 RNA and VGAM3665 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56951] VGAM3018 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3018 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3018 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM3018 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56952] VGAM3227 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3227 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3227 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3227 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56953] VGAM3406 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3406 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3406 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3406 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56954] VGAM3473 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3473 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3473 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3473 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56955] VGAM3509 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3509 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3509 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3509 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56956] VGAM3510 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3510 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3510 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3510 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56957] VGAM3589 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3589 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3589 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3589 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56958] VGAM3665 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3665 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3665 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3665 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56959] It is appreciated that a function of VGR4085 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4085 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4085 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4085 gene: VGAM3018 host target protein, VGAM3227 host target protein, VGAM3406 host target protein, VGAM3473 host target protein, VGAM3509 host target protein, VGAM3510 host target protein, VGAM3589 host target protein and VGAM3665 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3018, VGAM3227, VGAM3406, VGAM3473, VGAM3509, VGAM3510, VGAM3589 and VGAM3665

[56960] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4086(VGR4086) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[56961] VGR4086 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4086 gene was detected is described hereinabove with reference to Figs. 6–15.

[56962] VGR4086 gene encodes VGR4086 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56963] VGR4086 precursor RNA folds spatially, forming VGR4086 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4086 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4086 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56964] VGR4086 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3704 precursor RNA and VGAM3821 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56965] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3704 RNA and VGAM3821 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56966] VGAM3704 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3704 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3704 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM3704 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56967] VGAM3821 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3821 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3821 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3821 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56968] It is appreciated that a function of VGR4086 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4086 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4086 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4086 gene: VGAM3704 host target protein and VGAM3821 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM3704 and VGAM3821

[56969] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4087(VGR4087) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56970] VGR4087 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4087 gene was detected is described hereinabove with reference to Figs. 6-15.

[56971] VGR4087 gene encodes VGR4087 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56972] VGR4087 precursor RNA folds spatially, forming VGR4087 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4087 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4087 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[56973] VGR4087 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM76 precursor RNA, VGAM84 precursor RNA, VGAM86 precursor RNA, VGAM426 precursor RNA, VGAM438 precursor RNA, VGAM439 precursor RNA, VGAM440 precursor RNA and VGAM442 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56974] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM76 RNA, VGAM84 RNA, VGAM86 RNA, VGAM426 RNA, VGAM438 RNA, VGAM439 RNA, VGAM440 RNA and VGAM442 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56975] VGAM76 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM76 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM76 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM76 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[56976] VGAM84 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM84 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM84 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM84 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56977] VGAM86 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM86 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM86 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM86 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56978] VGAM426 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM426 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM426 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM426 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56979] VGAM438 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM438 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM438 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM438 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56980] VGAM439 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM439 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM439 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM439 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56981] VGAM440 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM440 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM440 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM440 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56982] VGAM442 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM442 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM442 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM442 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56983] It is appreciated that a function of VGR4087 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4087 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4087 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4087 gene: VGAM76 host target protein, VGAM84 host target protein, VGAM86 host target protein, VGAM426 host target protein, VGAM438 host target protein, VGAM439 host target protein, VGAM440 host target protein and VGAM442 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM76, VGAM84, VGAM86, VGAM426, VGAM438, VGAM439, VGAM440 and VGAM442

[56984] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4088(VGR4088) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[56985] VGR4088 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4088 gene was detected is described hereinabove with reference to Figs. 6–15.

[56986] VGR4088 gene encodes VGR4088 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[56987] VGR4088 precursor RNA folds spatially, forming VGR4088 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4088 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4088 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[56988] VGR4088 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM618 precursor RNA, VGAM694 precursor RNA, VGAM696 precursor RNA, VGAM735 precursor RNA, VGAM738 precursor RNA, VGAM740 precursor RNA,

VGAM742 precursor RNA and VGAM743 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[56989] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM618 RNA, VGAM694 RNA, VGAM696 RNA, VGAM735 RNA, VGAM738 RNA, VGAM740 RNA, VGAM742 RNA and VGAM743 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[56990] VGAM618 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM618 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM618 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM618 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[56991] VGAM694 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM694 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM694 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM694 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[56992] VGAM696 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM696 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM696 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM696 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[56993] VGAM735 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM735 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM735 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM735 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[56994] VGAM738 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM738 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM738 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM738 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[56995] VGAM740 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM740 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM740 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM740 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[56996] VGAM742 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM742 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM742 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM742 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[56997] VGAM743 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM743 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM743 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM743 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[56998] It is appreciated that a function of VGR4088 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4088 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4088 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4088 gene: VGAM618 host target protein, VGAM694 host target protein, VGAM696 host target protein, VGAM735 host target protein, VGAM738 host target protein, VGAM740 host target protein, VGAM742 host target protein and VGAM743 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM618, VGAM694, VGAM696, VGAM735, VGAM738, VGAM740, VGAM742 and VGAM743

[56999] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4089(VGR4089) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57000] VGR4089 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4089 gene was detected is described hereinabove with reference to Figs. 6–15.

[57001] VGR4089 gene encodes VGR4089 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57002] VGR4089 precursor RNA folds spatially, forming VGR4089 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4089 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4089 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57003] VGR4089 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM744 precursor RNA, VGAM745 precursor RNA, VGAM796 precursor RNA, VGAM904 precursor RNA, VGAM905 precursor RNA, VGAM906 precursor RNA, VGAM1008 precursor RNA and VGAM1010 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57004] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM744 RNA, VGAM745 RNA, VGAM796 RNA, VGAM904 RNA, VGAM905 RNA, VGAM906 RNA, VGAM1008 RNA and VGAM1010 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[57005] VGAM744 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM744 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM744 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM744 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57006] VGAM745 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM745 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM745 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM745 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57007] VGAM796 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM796 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM796 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM796 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57008] VGAM904 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM904 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM904 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM904 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57009] VGAM905 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM905 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM905 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM905 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57010] VGAM906 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM906 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM906 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM906 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57011] VGAM1008 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1008 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1008 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1008 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57012] VGAM1010 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1010 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1010 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1010 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57013] It is appreciated that a function of VGR4089 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4089 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4089 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4089 gene: VGAM744 host target protein, VGAM745 host target protein, VGAM796 host target protein, VGAM904 host target protein, VGAM905 host target protein, VGAM906 host target protein, VGAM1008 host target protein and VGAM1010 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to

VGAM744, VGAM745, VGAM796, VGAM904, VGAM905, VGAM906, VGAM1008 and VGAM1010

[57014] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4090(VGR4090) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57015] VGR4090 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4090 gene was detected is described hereinabove with reference to Figs. 6-15.

[57016] VGR4090 gene encodes VGR4090 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57017] VGR4090 precursor RNA folds spatially, forming VGR4090 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4090 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4090 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57018] VGR4090 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1295 precursor RNA, VGAM1296 precursor RNA, VGAM1570 precursor RNA, VGAM1571 precursor RNA, VGAM1572 precursor RNA, VGAM1573 precursor RNA, VGAM1669 precursor RNA and VGAM1670 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57019] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1295

RNA, VGAM1296 RNA, VGAM1570 RNA, VGAM1571 RNA, VGAM1572 RNA, VGAM1573 RNA, VGAM1669 RNA and VGAM1670 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57020] VGAM1295 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1295 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1295 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1295 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57021] VGAM1296 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1296 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1296 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1296 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57022] VGAM1570 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1570 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1570 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1570 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57023] VGAM1571 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1571 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1571 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1571 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57024] VGAM1572 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1572 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1572 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1572 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57025] VGAM1573 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM1573 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1573 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1573 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57026] VGAM1669 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1669 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1669 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1669 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57027] VGAM1670 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1670 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1670 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1670 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57028] It is appreciated that a function of VGR4090 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4090 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4090 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4090 gene: VGAM1295 host target protein, VGAM1296 host target protein, VGAM1570 host target protein, VGAM1571 host target

protein, VGAM1572 host target protein, VGAM1573 host target protein, VGAM1669 host target protein and VGAM1670 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1295, VGAM1296, VGAM1570, VGAM1571, VGAM1572, VGAM1573, VGAM1669 and VGAM1670

[57029] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4091(VGR4091) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57030] VGR4091 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4091 gene was detected is described hereinabove with reference to Figs. 6-15.

[57031] VGR4091 gene encodes VGR4091 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57032] VGR4091 precursor RNA folds spatially, forming VGR4091 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4091 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4091 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57033] VGR4091 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1671 precursor RNA, VGAM1673 precursor RNA, VGAM1676 precursor RNA, VGAM1748 precursor RNA, VGAM1939 precursor RNA, VGAM2271 precursor RNA, VGAM2424 precursor RNA and VGAM2425 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57034] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1671 RNA, VGAM1673 RNA, VGAM1676 RNA, VGAM1748 RNA, VGAM1939 RNA, VGAM2271 RNA, VGAM2424 RNA and VGAM2425 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57035] VGAM1671 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1671 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1671 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM1671 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57036] VGAM1673 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1673 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1673 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1673 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57037] VGAM1676 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1676 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1676 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM1676 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57038] VGAM1748 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1748 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1748 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1748 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57039] VGAM1939 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1939 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1939 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1939 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57040] VGAM2271 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2271 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2271 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2271 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57041] VGAM2424 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2424 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2424 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2424 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57042] VGAM2425 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2425 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2425 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2425 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57043] It is appreciated that a function of VGR4091 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4091 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4091 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4091 gene: VGAM1671 host target protein, VGAM1673 host target protein, VGAM1676 host target protein, VGAM1748 host target protein, VGAM1939 host target protein, VGAM2271 host target protein, VGAM2424 host target protein and VGAM2425 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1671, VGAM1673, VGAM1676, VGAM1748, VGAM1939, VGAM2271, VGAM2424 and VGAM2425

[57044] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4092(VGR4092) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[57045] VGR4092 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4092 gene was detected is described hereinabove with reference to Figs. 6–15.

[57046] VGR4092 gene encodes VGR4092 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57047] VGR4092 precursor RNA folds spatially, forming VGR4092 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4092 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4092 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57048] VGR4092 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM pre–

cursor RNAs, VGAM2485 precursor RNA, VGAM2989 precursor RNA, VGAM3491 precursor RNA, VGAM3545 precursor RNA and VGAM3753 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57049] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2485 RNA, VGAM2989 RNA, VGAM3491 RNA, VGAM3545 RNA and VGAM3753 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57050] VGAM2485 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2485 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2485 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2485 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57051] VGAM2989 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2989 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2989 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2989 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57052] VGAM3491 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3491 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3491 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3491 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57053] VGAM3545 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3545 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3545 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3545 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57054] VGAM3753 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3753 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3753 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3753 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57055] It is appreciated that a function of VGR4092 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4092 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4092 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4092 gene: VGAM2485 host target protein, VGAM2989 host target protein, VGAM3491 host target protein, VGAM3545 host target protein and VGAM3753 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated

hereinabove with reference to VGAM2485, VGAM2989, VGAM3491, VGAM3545 and VGAM3753

[57056] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4093(VGR4093) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57057] VGR4093 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4093 gene was detected is described hereinabove with reference to Figs. 6–15.

[57058] VGR4093 gene encodes VGR4093 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57059] VGR4093 precursor RNA folds spatially, forming VGR4093 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4093 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4093 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57060] VGR4093 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM223 precursor RNA, VGAM226 precursor RNA, VGAM227 precursor RNA, VGAM230 precursor RNA, VGAM231 precursor RNA, VGAM242 precursor RNA, VGAM243 precursor RNA and VGAM245 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57061] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM223

RNA, VGAM226 RNA, VGAM227 RNA, VGAM230 RNA, VGAM231 RNA, VGAM242 RNA, VGAM243 RNA and VGAM245 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57062] VGAM223 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM223 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM223 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM223 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57063] VGAM226 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM226 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM226 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM226 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57064] VGAM227 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM227 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM227 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM227 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57065] VGAM230 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM230 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM230 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM230 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57066] VGAM231 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM231 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM231 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM231 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57067] VGAM242 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM242 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM242 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM242 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57068] VGAM243 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM243 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM243 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM243 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57069] VGAM245 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM245 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM245 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM245 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57070] It is appreciated that a function of VGR4093 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4093 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4093 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4093 gene: VGAM223 host target protein, VGAM226 host target protein, VGAM227 host target protein, VGAM230 host target protein,

VGAM231 host target protein, VGAM242 host target protein, VGAM243 host target protein and VGAM245 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM223, VGAM226, VGAM227, VGAM230, VGAM231, VGAM242, VGAM243 and VGAM245

[57071] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4094(VGR4094) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57072] VGR4094 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4094 gene was detected is described hereinabove with reference to Figs. 6-15.

[57073] VGR4094 gene encodes VGR4094 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[57074] VGR4094 precursor RNA folds spatially, forming VGR4094 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4094 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4094 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57075] VGR4094 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM467 precursor RNA, VGAM484 precursor RNA, VGAM487 precursor RNA, VGAM498 precursor RNA, VGAM500 precursor RNA, VGAM502 precursor RNA, VGAM503 precursor RNA and VGAM527 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively,

each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57076] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM467 RNA, VGAM484 RNA, VGAM487 RNA, VGAM498 RNA, VGAM500 RNA, VGAM502 RNA, VGAM503 RNA and VGAM527 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57077] VGAM467 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM467 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM467 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM467 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57078] VGAM484 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM484 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM484 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM484 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57079] VGAM487 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM487 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM487 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM487 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57080] VGAM498 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM498 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM498 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM498 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57081] VGAM500 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM500 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM500 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM500 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57082] VGAM502 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM502 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM502 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM502 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57083] VGAM503 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM503 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM503 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM503 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57084] VGAM527 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM527 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM527 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM527 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[57085] It is appreciated that a function of VGR4094 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4094 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4094 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4094 gene: VGAM467 host target protein, VGAM484 host target protein, VGAM487 host target protein, VGAM498 host target protein, VGAM500 host target protein, VGAM502 host target protein, VGAM503 host target protein and VGAM527 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM467, VGAM484, VGAM487, VGAM498, VGAM500, VGAM502, VGAM503 and VGAM527

[57086] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4095(VGR4095) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57087] VGR4095 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4095 gene was detected is described hereinabove with reference to Figs. 6-15.

[57088] VGR4095 gene encodes VGR4095 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57089] VGR4095 precursor RNA folds spatially, forming VGR4095 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4095 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4095 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57090] VGR4095 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM614 precursor RNA, VGAM615 precursor RNA, VGAM638 precursor RNA, VGAM639 precursor RNA, VGAM642 precursor RNA, VGAM643 precursor RNA, VGAM757 precursor RNA and VGAM762 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57091] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM614 RNA, VGAM615 RNA, VGAM638 RNA, VGAM639 RNA, VGAM642 RNA, VGAM643 RNA, VGAM757 RNA and VGAM762 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57092] VGAM614 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM614 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM614 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM614 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57093] VGAM615 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM615 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM615 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM615 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57094] VGAM638 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM638 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM638 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM638 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57095] VGAM639 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM639 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM639 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM639 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57096] VGAM642 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM642 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM642 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM642 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57097] VGAM643 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM643 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM643 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM643 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57098] VGAM757 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM757 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM757 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM757 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57099] VGAM762 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM762 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM762 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM762 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57100] It is appreciated that a function of VGR4095 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4095 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4095 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4095 gene: VGAM614 host target protein, VGAM615 host target protein, VGAM638 host target protein, VGAM639 host target protein, VGAM642 host target protein, VGAM643 host target protein, VGAM757 host target protein and VGAM762 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM614, VGAM615, VGAM638, VGAM639, VGAM642, VGAM643, VGAM757 and VGAM762

[57101] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4096(VGR4096) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57102] VGR4096 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4096 gene was detected is described hereinabove with reference to Figs. 6–15.

[57103] VGR4096 gene encodes VGR4096 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57104] VGR4096 precursor RNA folds spatially, forming VGR4096 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4096 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4096 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57105] VGR4096 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM799 precursor RNA, VGAM959 precursor RNA, VGAM960 precursor RNA, VGAM1054 precursor RNA, VGAM1191 precursor RNA, VGAM1336 precursor RNA, VGAM1419 precursor RNA and VGAM1421 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57106] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM799 RNA, VGAM959 RNA, VGAM960 RNA, VGAM1054 RNA, VGAM1191 RNA, VGAM1336 RNA, VGAM1419 RNA and VGAM1421 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57107] VGAM799 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM799 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM799 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM799 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57108] VGAM959 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM959 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM959 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM959 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57109] VGAM960 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM960 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM960 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM960 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57110] VGAM1054 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1054 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1054 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1054 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57111] VGAM1191 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1191 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1191 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1191 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57112] VGAM1336 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1336 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1336 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1336 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57113] VGAM1419 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1419 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1419 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1419 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[57114] VGAM1421 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1421 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1421 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1421 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57115] It is appreciated that a function of VGR4096 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4096 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4096 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4096 gene: VGAM799 host

target protein, VGAM959 host target protein, VGAM960 host target protein, VGAM1054 host target protein, VGAM1191 host target protein, VGAM1336 host target protein, VGAM1419 host target protein and VGAM1421 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM799, VGAM959, VGAM960, VGAM1054, VGAM1191, VGAM1336, VGAM1419 and VGAM1421

[57116] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4097(VGR4097) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57117] VGR4097 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4097 gene was detected is described hereinabove with reference to Figs. 6-15.

- [57118] VGR4097 gene encodes VGR4097 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.
- [57119] VGR4097 precursor RNA folds spatially, forming VGR4097 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4097 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4097 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.
- [57120] VGR4097 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1423 precursor RNA, VGAM1483 precursor RNA, VGAM1484 precursor RNA, VGAM1485 precursor RNA, VGAM1524 precursor RNA, VGAM1528 precursor RNA, VGAM1556 precursor RNA and VGAM1557 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57121] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1423 RNA, VGAM1483 RNA, VGAM1484 RNA, VGAM1485 RNA, VGAM1524 RNA, VGAM1528 RNA, VGAM1556 RNA and VGAM1557 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57122] VGAM1423 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1423 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1423 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM1423 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57123] VGAM1483 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1483 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1483 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1483 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57124] VGAM1484 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1484 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1484 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1484 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57125] VGAM1485 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1485 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1485 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1485 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57126] VGAM1524 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1524 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1524 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1524 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57127] VGAM1528 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1528 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1528 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1528 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57128] VGAM1556 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1556 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1556 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1556 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57129] VGAM1557 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1557 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1557 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1557 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57130] It is appreciated that a function of VGR4097 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4097 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4097 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4097 gene: VGAM1423 host target protein, VGAM1483 host target protein, VGAM1484 host target protein, VGAM1485 host target protein, VGAM1524 host target protein, VGAM1528 host target protein, VGAM1556 host target protein and VGAM1557 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1423, VGAM1483, VGAM1484, VGAM1485, VGAM1524, VGAM1528, VGAM1556 and VGAM1557

[57131] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4098(VGR4098) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[57132] VGR4098 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4098 gene was detected is described hereinabove with reference to Figs. 6–15.

[57133] VGR4098 gene encodes VGR4098 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57134] VGR4098 precursor RNA folds spatially, forming VGR4098 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4098 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4098 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57135] VGR4098 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1583 precursor RNA, VGAM1585 precursor RNA, VGAM1586 precursor RNA, VGAM1973 precursor RNA, VGAM2006 precursor RNA, VGAM2007 precursor RNA, VGAM2008 precursor RNA and VGAM2009 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57136] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1583 RNA, VGAM1585 RNA, VGAM1586 RNA, VGAM1973 RNA, VGAM2006 RNA, VGAM2007 RNA, VGAM2008 RNA and VGAM2009 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57137] VGAM1583 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1583 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1583 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1583 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57138] VGAM1585 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1585 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1585 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1585 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57139] VGAM1586 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1586 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1586 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1586 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57140] VGAM1973 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1973 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1973 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1973 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[57141] VGAM2006 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2006 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2006 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2006 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57142] VGAM2007 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2007 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2007 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2007 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57143] VGAM2008 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2008 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2008 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2008 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57144] VGAM2009 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2009 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2009 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM2009 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57145] It is appreciated that a function of VGR4098 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4098 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4098 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4098 gene: VGAM1583 host target protein, VGAM1585 host target protein, VGAM1586 host target protein, VGAM1973 host target protein, VGAM2006 host target protein, VGAM2007 host target protein, VGAM2008 host target protein and VGAM2009 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1583, VGAM1585, VGAM1586, VGAM1973, VGAM2006, VGAM2007, VGAM2008 and

VGAM2009

[57146] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4099(VGR4099) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57147] VGR4099 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4099 gene was detected is described hereinabove with reference to Figs. 6–15.

[57148] VGR4099 gene encodes VGR4099 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57149] VGR4099 precursor RNA folds spatially, forming VGR4099 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4099 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4099 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57150] VGR4099 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2010 precursor RNA, VGAM2029 precursor RNA, VGAM2030 precursor RNA, VGAM2031 precursor RNA, VGAM2092 precursor RNA, VGAM2093 precursor RNA, VGAM2118 precursor RNA and VGAM2119 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57151] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2010 RNA, VGAM2029 RNA, VGAM2030 RNA, VGAM2031 RNA,

VGAM2092 RNA, VGAM2093 RNA, VGAM2118 RNA and VGAM2119 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57152] VGAM2010 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2010 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2010 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2010 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57153] VGAM2029 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2029 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2029 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2029 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57154] VGAM2030 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2030 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2030 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2030 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57155] VGAM2031 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2031 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2031 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2031 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57156] VGAM2092 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2092 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2092 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2092 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57157] VGAM2093 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2093 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2093 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2093 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57158] VGAM2118 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2118 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2118 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2118 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57159] VGAM2119 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM2119 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2119 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2119 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57160] It is appreciated that a function of VGR4099 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4099 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4099 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4099 gene: VGAM2010 host target protein, VGAM2029 host target protein, VGAM2030 host target protein, VGAM2031 host target protein, VGAM2092 host target protein, VGAM2093 host

target protein, VGAM2118 host target protein and VGAM2119 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2010, VGAM2029, VGAM2030, VGAM2031, VGAM2092, VGAM2093, VGAM2118 and VGAM2119

[57161] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4100(VGR4100) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57162] VGR4100 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4100 gene was detected is described hereinabove with reference to Figs. 6–15.

[57163] VGR4100 gene encodes VGR4100 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[57164] VGR4100 precursor RNA folds spatially, forming VGR4100 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4100 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4100 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57165] VGR4100 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2120 precursor RNA, VGAM2209 precursor RNA, VGAM2221 precursor RNA, VGAM2222 precursor RNA, VGAM2223 precursor RNA, VGAM2366 precursor RNA, VGAM2436 precursor RNA and VGAM2453 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRE-

CURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57166] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2120 RNA, VGAM2209 RNA, VGAM2221 RNA, VGAM2222 RNA, VGAM2223 RNA, VGAM2366 RNA, VGAM2436 RNA and VGAM2453 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57167] VGAM2120 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2120 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2120 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2120 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57168] VGAM2209 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2209 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2209 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2209 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57169] VGAM2221 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2221 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2221 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM2221 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57170] VGAM2222 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2222 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2222 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2222 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57171] VGAM2223 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2223 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2223 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM2223 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57172] VGAM2366 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2366 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2366 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2366 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57173] VGAM2436 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2436 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2436 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2436 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57174] VGAM2453 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2453 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2453 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2453 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57175] It is appreciated that a function of VGR4100 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4100 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4100

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4100 gene: VGAM2120 host target protein, VGAM2209 host target protein, VGAM2221 host target protein, VGAM2222 host target protein, VGAM2223 host target protein, VGAM2366 host target protein, VGAM2436 host target protein and VGAM2453 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2120, VGAM2209, VGAM2221, VGAM2222, VGAM2223, VGAM2366, VGAM2436 and VGAM2453

[57176] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4101(VGR4101) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57177] VGR4101 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4101 gene was detected is described hereinabove with reference to Figs. 6–15.

[57178] VGR4101 gene encodes VGR4101 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57179] VGR4101 precursor RNA folds spatially, forming VGR4101 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4101 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4101 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57180] VGR4101 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2521 precursor RNA, VGAM2522 pre–

cursor RNA, VGAM2705 precursor RNA, VGAM2720 precursor RNA, VGAM2729 precursor RNA, VGAM2776 precursor RNA, VGAM2847 precursor RNA and VGAM2850 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57181] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2521 RNA, VGAM2522 RNA, VGAM2705 RNA, VGAM2720 RNA, VGAM2729 RNA, VGAM2776 RNA, VGAM2847 RNA and VGAM2850 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57182] VGAM2521 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2521 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2521 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2521 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57183] VGAM2522 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2522 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2522 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2522 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57184] VGAM2705 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM2705 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2705 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2705 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57185] VGAM2720 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2720 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2720 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2720 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57186] VGAM2729 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2729 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2729 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2729 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57187] VGAM2776 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2776 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2776 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2776 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57188] VGAM2847 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2847 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2847 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2847 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57189] VGAM2850 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2850 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2850 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2850 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[57190] It is appreciated that a function of VGR4101 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4101 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4101 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4101 gene: VGAM2521 host target protein, VGAM2522 host target protein, VGAM2705 host target protein, VGAM2720 host target protein, VGAM2729 host target protein, VGAM2776 host target protein, VGAM2847 host target protein and VGAM2850 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2521, VGAM2522, VGAM2705, VGAM2720, VGAM2729, VGAM2776, VGAM2847 and VGAM2850

[57191] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4102(VGR4102) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57192] VGR4102 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4102 gene was detected is described hereinabove with reference to Figs. 6–15.

[57193] VGR4102 gene encodes VGR4102 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57194] VGR4102 precursor RNA folds spatially, forming VGR4102 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4102 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4102 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57195] VGR4102 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2872 precursor RNA, VGAM3147 precursor RNA, VGAM3292 precursor RNA, VGAM3364 precursor RNA, VGAM3378 precursor RNA, VGAM3379 precursor RNA, VGAM3422 precursor RNA and VGAM3511 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57196] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2872 RNA, VGAM3147 RNA, VGAM3292 RNA, VGAM3364 RNA, VGAM3378 RNA, VGAM3379 RNA, VGAM3422 RNA and VGAM3511 RNA respectively, herein schematically repre-

sented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57197] VGAM2872 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2872 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2872 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2872 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57198] VGAM3147 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3147 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3147 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3147 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57199] VGAM3292 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3292 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3292 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3292 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57200] VGAM3364 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3364 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3364 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3364 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57201] VGAM3378 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3378 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3378 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3378 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57202] VGAM3379 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3379 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3379 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3379 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57203] VGAM3422 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3422 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3422 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3422 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57204] VGAM3511 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3511 host target RNA, herein schematically represented by VGAM8

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3511 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3511 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57205] It is appreciated that a function of VGR4102 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4102 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4102 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4102 gene: VGAM2872 host target protein, VGAM3147 host target protein, VGAM3292 host target protein, VGAM3364 host target protein, VGAM3378 host target protein, VGAM3379 host target protein, VGAM3422 host target protein and VGAM3511 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2872, VGAM3147, VGAM3292, VGAM3364, VGAM3378, VGAM3379, VGAM3422 and VGAM3511

[57206] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4103(VGR4103) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57207] VGR4103 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4103 gene was detected is described hereinabove with reference to Figs. 6–15.

[57208] VGR4103 gene encodes VGR4103 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57209] VGR4103 precursor RNA folds spatially, forming VGR4103

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4103 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4103 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57210] VGR4103 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3527 precursor RNA, VGAM3528 precursor RNA, VGAM3581 precursor RNA, VGAM3621 precursor RNA, VGAM3639 precursor RNA, VGAM3667 precursor RNA, VGAM3718 precursor RNA and VGAM3722 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to

VGAM PRECURSOR RNA of Fig. 8.

[57211] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3527 RNA, VGAM3528 RNA, VGAM3581 RNA, VGAM3621 RNA, VGAM3639 RNA, VGAM3667 RNA, VGAM3718 RNA and VGAM3722 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57212] VGAM3527 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3527 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3527 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3527 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57213] VGAM3528 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3528 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3528 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3528 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57214] VGAM3581 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3581 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3581 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3581 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[57215] VGAM3621 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3621 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3621 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3621 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57216] VGAM3639 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3639 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3639 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3639 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57217] VGAM3667 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3667 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3667 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3667 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57218] VGAM3718 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3718 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3718 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM3718 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57219] VGAM3722 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3722 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3722 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3722 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57220] It is appreciated that a function of VGR4103 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4103 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4103 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4103 gene: VGAM3527 host target protein, VGAM3528 host target protein, VGAM3581 host target protein, VGAM3621 host target protein, VGAM3639 host target protein, VGAM3667 host target protein, VGAM3718 host target protein and VGAM3722 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3527, VGAM3528, VGAM3581, VGAM3621, VGAM3639, VGAM3667, VGAM3718 and VGAM3722

[57221] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4104(VGR4104) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57222] VGR4104 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4104 gene was detected is described hereinabove with reference to Figs. 6–15.

[57223] VGR4104 gene encodes VGR4104 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57224] VGR4104 precursor RNA folds spatially, forming VGR4104 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4104 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4104 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57225] VGR4104 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM3723 precursor RNA, VGAM3770 precursor RNA, VGAM3790 precursor RNA, VGAM3818 precursor RNA, VGAM3820 precursor RNA and VGAM3822

precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57226] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3723 RNA, VGAM3770 RNA, VGAM3790 RNA, VGAM3818 RNA, VGAM3820 RNA and VGAM3822 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57227] VGAM3723 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3723 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3723 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM3723 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57228] VGAM3770 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3770 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3770 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3770 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57229] VGAM3790 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3790 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3790 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3790 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57230] VGAM3818 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3818 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3818 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3818 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57231] VGAM3820 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3820 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3820 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3820 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57232] VGAM3822 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3822 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3822 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3822 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57233] It is appreciated that a function of VGR4104 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4104 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4104 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4104 gene: VGAM3723 host target protein, VGAM3770 host target protein, VGAM3790 host target protein, VGAM3818 host target protein, VGAM3820 host target protein and VGAM3822 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3723, VGAM3770, VGAM3790, VGAM3818, VGAM3820 and VGAM3822

[57234] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4105(VGR4105) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57235] VGR4105 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4105 gene was detected is described hereinabove with reference to Figs. 6–15.

[57236] VGR4105 gene encodes VGR4105 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57237] VGR4105 precursor RNA folds spatially, forming VGR4105 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4105 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4105 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57238] VGR4105 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM96 precursor RNA, VGAM441 precursor RNA, VGAM443 precursor RNA, VGAM661 precursor

RNA, VGAM662 precursor RNA, VGAM739 precursor RNA, VGAM741 precursor RNA and VGAM822 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57239] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM96 RNA, VGAM441 RNA, VGAM443 RNA, VGAM661 RNA, VGAM662 RNA, VGAM739 RNA, VGAM741 RNA and VGAM822 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57240] VGAM96 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM96 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM96 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM96 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57241] VGAM441 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM441 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM441 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM441 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57242] VGAM443 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM443 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM443 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM443 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57243] VGAM661 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM661 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM661 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM661 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57244] VGAM662 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM662 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM662 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM662 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57245] VGAM739 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM739 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM739 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM739 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57246] VGAM741 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM741 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM741 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM741 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57247] VGAM822 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM822 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM822 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM822 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57248] It is appreciated that a function of VGR4105 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4105 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4105 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4105 gene: VGAM96 host target protein, VGAM441 host target protein, VGAM443 host target protein, VGAM661 host target protein, VGAM662 host target protein, VGAM739 host target protein, VGAM741 host target protein and VGAM822 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM96, VGAM441, VGAM443, VGAM661, VGAM662, VGAM739, VGAM741 and VGAM822

[57249] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4106(VGR4106) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57250] VGR4106 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4106 gene was detected is described hereinabove with reference to Figs. 6–15.

[57251] VGR4106 gene encodes VGR4106 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57252] VGR4106 precursor RNA folds spatially, forming VGR4106 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4106 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4106 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[57253] VGR4106 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM823 precursor RNA, VGAM824 precursor RNA, VGAM825 precursor RNA, VGAM826 precursor RNA, VGAM827 precursor RNA, VGAM844 precursor RNA, VGAM937 precursor RNA and VGAM938 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57254] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM823 RNA, VGAM824 RNA, VGAM825 RNA, VGAM826 RNA, VGAM827 RNA, VGAM844 RNA, VGAM937 RNA and VGAM938 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57255] VGAM823 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM823 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM823 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM823 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57256] VGAM824 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM824 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM824 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM824 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57257] VGAM825 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM825 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM825 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM825 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57258] VGAM826 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM826 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM826 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM826 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57259] VGAM827 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM827 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM827 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM827 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57260] VGAM844 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM844 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM844 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM844 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57261] VGAM937 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM937 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM937 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM937 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57262] VGAM938 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM938 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM938 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM938 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57263] It is appreciated that a function of VGR4106 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4106 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4106 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4106 gene: VGAM823 host target protein, VGAM824 host target protein, VGAM825 host target protein, VGAM826 host target protein, VGAM827 host target protein, VGAM844 host target protein, VGAM937 host target protein and VGAM938 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host tar-

get genes is elaborated hereinabove with reference to VGAM823, VGAM824, VGAM825, VGAM826, VGAM827, VGAM844, VGAM937 and VGAM938

[57264] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4107(VGR4107) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57265] VGR4107 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4107 gene was detected is described hereinabove with reference to Figs. 6–15.

[57266] VGR4107 gene encodes VGR4107 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57267] VGR4107 precursor RNA folds spatially, forming VGR4107 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4107 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4107 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57268] VGR4107 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM939 precursor RNA, VGAM1030 precursor RNA, VGAM1031 precursor RNA, VGAM1032 precursor RNA, VGAM1087 precursor RNA, VGAM1088 precursor RNA, VGAM1108 precursor RNA and VGAM1134 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57269] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM939 RNA, VGAM1030 RNA, VGAM1031 RNA, VGAM1032 RNA, VGAM1087 RNA, VGAM1088 RNA, VGAM1108 RNA and VGAM1134 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57270] VGAM939 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM939 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM939 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM939 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57271] VGAM1030 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1030 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1030 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1030 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57272] VGAM1031 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1031 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1031 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1031 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57273] VGAM1032 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM1032 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1032 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1032 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57274] VGAM1087 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1087 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1087 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1087 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57275] VGAM1088 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1088 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1088 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1088 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57276] VGAM1108 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1108 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1108 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1108 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57277] VGAM1134 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1134 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1134 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1134 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57278] It is appreciated that a function of VGR4107 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4107 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4107 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4107 gene: VGAM939 host target protein, VGAM1030 host target protein, VGAM1031

host target protein, VGAM1032 host target protein, VGAM1087 host target protein, VGAM1088 host target protein, VGAM1108 host target protein and VGAM1134 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM939, VGAM1030, VGAM1031, VGAM1032, VGAM1087, VGAM1088, VGAM1108 and VGAM1134

[57279] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4108(VGR4108) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57280] VGR4108 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4108 gene was detected is described hereinabove with reference to Figs. 6-15.

[57281] VGR4108 gene encodes VGR4108 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57282] VGR4108 precursor RNA folds spatially, forming VGR4108 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4108 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4108 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57283] VGR4108 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1135 precursor RNA, VGAM1136 precursor RNA, VGAM1257 precursor RNA, VGAM1259 precursor RNA, VGAM1260 precursor RNA, VGAM1529 precursor RNA, VGAM1531 precursor RNA and VGAM1600 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57284] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1135 RNA, VGAM1136 RNA, VGAM1257 RNA, VGAM1259 RNA, VGAM1260 RNA, VGAM1529 RNA, VGAM1531 RNA and VGAM1600 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57285] VGAM1135 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1135 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1135 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM1135 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57286] VGAM1136 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1136 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1136 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1136 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57287] VGAM1257 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1257 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1257 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM1257 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57288] VGAM1259 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1259 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1259 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1259 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57289] VGAM1260 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1260 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1260 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1260 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57290] VGAM1529 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1529 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1529 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1529 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57291] VGAM1531 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1531 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1531 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1531 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57292] VGAM1600 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1600 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1600 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1600 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57293] It is appreciated that a function of VGR4108 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4108 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4108 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4108 gene: VGAM1135 host target protein, VGAM1136 host target protein, VGAM1257 host target protein, VGAM1259 host target protein, VGAM1260 host target protein, VGAM1529 host target protein, VGAM1531 host target protein and VGAM1600 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1135, VGAM1136, VGAM1257, VGAM1259, VGAM1260, VGAM1529, VGAM1531 and VGAM1600

[57294] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4109(VGR4109) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[57295] VGR4109 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4109 gene was detected is described hereinabove with reference to Figs. 6–15.

[57296] VGR4109 gene encodes VGR4109 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57297] VGR4109 precursor RNA folds spatially, forming VGR4109 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4109 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4109 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57298] VGR4109 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM1602 precursor RNA, VGAM1604 precursor RNA, VGAM1943 precursor RNA, VGAM1944 precursor RNA, VGAM1945 precursor RNA, VGAM2086 precursor RNA, VGAM2090 precursor RNA and VGAM2091 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57299] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1602 RNA, VGAM1604 RNA, VGAM1943 RNA, VGAM1944 RNA, VGAM1945 RNA, VGAM2086 RNA, VGAM2090 RNA and VGAM2091 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57300] VGAM1602 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM1602 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1602 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1602 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57301] VGAM1604 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1604 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1604 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1604 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57302] VGAM1943 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1943 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1943 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1943 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57303] VGAM1944 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1944 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1944 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1944 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57304] VGAM1945 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1945 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1945 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1945 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57305] VGAM2086 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2086 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2086 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2086 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[57306] VGAM2090 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2090 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2090 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2090 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57307] VGAM2091 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2091 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2091 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2091 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57308] It is appreciated that a function of VGR4109 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4109 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4109 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4109 gene: VGAM1602 host target protein, VGAM1604 host target protein, VGAM1943 host target protein, VGAM1944 host target protein, VGAM1945 host target protein, VGAM2086 host target protein, VGAM2090 host target protein and VGAM2091 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1602, VGAM1604, VGAM1943, VGAM1944, VGAM1945, VGAM2086, VGAM2090 and VGAM2091

[57309] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4110(VGR4110) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57310] VGR4110 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4110 gene was detected is described hereinabove with reference to Figs. 6-15.

[57311] VGR4110 gene encodes VGR4110 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57312] VGR4110 precursor RNA folds spatially, forming VGR4110 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4110 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4110 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57313] VGR4110 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2163 precursor RNA, VGAM2164 precursor RNA, VGAM2171 precursor RNA, VGAM2283 precursor RNA, VGAM2284 precursor RNA, VGAM2303 precursor RNA, VGAM2587 precursor RNA and VGAM2604 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57314] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2163 RNA, VGAM2164 RNA, VGAM2171 RNA, VGAM2283 RNA, VGAM2284 RNA, VGAM2303 RNA, VGAM2587 RNA and

VGAM2604 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57315] VGAM2163 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2163 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2163 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2163 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57316] VGAM2164 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2164 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2164 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2164 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57317] VGAM2171 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2171 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2171 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2171 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57318] VGAM2283 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2283 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2283 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2283 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57319] VGAM2284 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2284 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2284 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2284 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57320] VGAM2303 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2303 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2303 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2303 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57321] VGAM2587 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2587 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2587 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2587 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57322] VGAM2604 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2604 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2604 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2604 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57323] It is appreciated that a function of VGR4110 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4110 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4110 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4110 gene: VGAM2163 host target protein, VGAM2164 host target protein, VGAM2171 host target protein, VGAM2283 host target protein, VGAM2284 host target protein, VGAM2303 host target protein, VGAM2587 host target protein and

VGAM2604 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2163, VGAM2164, VGAM2171, VGAM2283, VGAM2284, VGAM2303, VGAM2587 and VGAM2604

[57324] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4111(VGR4111) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57325] VGR4111 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4111 gene was detected is described hereinabove with reference to Figs. 6-15.

[57326] VGR4111 gene encodes VGR4111 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57327] VGR4111 precursor RNA folds spatially, forming VGR4111 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4111 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4111 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57328] VGR4111 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM3132 precursor RNA, VGAM3501 precursor RNA, VGAM3637 precursor RNA, VGAM3638 precursor RNA, VGAM3662 precursor RNA and VGAM3811 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57329] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3132 RNA, VGAM3501 RNA, VGAM3637 RNA, VGAM3638 RNA, VGAM3662 RNA and VGAM3811 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57330] VGAM3132 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3132 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3132 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3132 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57331] VGAM3501 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM3501 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3501 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3501 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57332] VGAM3637 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3637 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3637 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3637 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57333] VGAM3638 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3638 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3638 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3638 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57334] VGAM3662 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3662 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3662 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3662 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57335] VGAM3811 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3811 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3811 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3811 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57336] It is appreciated that a function of VGR4111 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4111 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4111 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4111 gene: VGAM3132 host target protein, VGAM3501 host target protein,

VGAM3637 host target protein, VGAM3638 host target protein, VGAM3662 host target protein and VGAM3811 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3132, VGAM3501, VGAM3637, VGAM3638, VGAM3662 and VGAM3811

[57337] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4112(VGR4112) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57338] VGR4112 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4112 gene was detected is described hereinabove with reference to Figs. 6–15.

[57339] VGR4112 gene encodes VGR4112 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[57340] VGR4112 precursor RNA folds spatially, forming VGR4112 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4112 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4112 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57341] VGR4112 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM116 precursor RNA, VGAM131 precursor RNA, VGAM143 precursor RNA, VGAM671 precursor RNA, VGAM673 precursor RNA, VGAM830 precursor RNA, VGAM831 precursor RNA and VGAM843 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively,

each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57342] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM116 RNA, VGAM131 RNA, VGAM143 RNA, VGAM671 RNA, VGAM673 RNA, VGAM830 RNA, VGAM831 RNA and VGAM843 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57343] VGAM116 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM116 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM116 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM116 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57344] VGAM131 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM131 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM131 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM131 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57345] VGAM143 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM143 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM143 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM143 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57346] VGAM671 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM671 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM671 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM671 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57347] VGAM673 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM673 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM673 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM673 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57348] VGAM830 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM830 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM830 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM830 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57349] VGAM831 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM831 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM831 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM831 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57350] VGAM843 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM843 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM843 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM843 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57351] It is appreciated that a function of VGR4112 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4112 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4112

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4112 gene: VGAM116 host target protein, VGAM131 host target protein, VGAM143 host target protein, VGAM671 host target protein, VGAM673 host target protein, VGAM830 host target protein, VGAM831 host target protein and VGAM843 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM116, VGAM131, VGAM143, VGAM671, VGAM673, VGAM830, VGAM831 and VGAM843

[57352] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4113(VGR4113) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57353] VGR4113 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4113 gene was detected is described hereinabove with reference to Figs. 6–15.

[57354] VGR4113 gene encodes VGR4113 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57355] VGR4113 precursor RNA folds spatially, forming VGR4113 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4113 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4113 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57356] VGR4113 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM907 precursor RNA, VGAM908 precursor RNA, VGAM1022 precursor RNA, VGAM1023 precursor

RNA, VGAM1026 precursor RNA, VGAM1027 precursor RNA, VGAM1284 precursor RNA and VGAM1418 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57357] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM907 RNA, VGAM908 RNA, VGAM1022 RNA, VGAM1023 RNA, VGAM1026 RNA, VGAM1027 RNA, VGAM1284 RNA and VGAM1418 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57358] VGAM907 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM907 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM907 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM907 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57359] VGAM908 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM908 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM908 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM908 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57360] VGAM1022 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1022 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1022 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1022 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57361] VGAM1023 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1023 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1023 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1023 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57362] VGAM1026 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM1026 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1026 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1026 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57363] VGAM1027 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1027 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1027 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1027 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57364] VGAM1284 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1284 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1284 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1284 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57365] VGAM1418 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1418 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1418 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1418 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57366] It is appreciated that a function of VGR4113 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4113 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4113 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4113 gene: VGAM907 host target protein, VGAM908 host target protein, VGAM1022 host target protein, VGAM1023 host target protein, VGAM1026 host target protein, VGAM1027 host target protein, VGAM1284 host target protein and VGAM1418 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM907, VGAM908, VGAM1022, VGAM1023, VGAM1026, VGAM1027, VGAM1284 and VGAM1418

[57367] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4114(VGR4114) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57368] VGR4114 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4114 gene was detected is described hereinabove with reference to Figs. 6–15.

[57369] VGR4114 gene encodes VGR4114 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57370] VGR4114 precursor RNA folds spatially, forming VGR4114 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4114 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4114 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[57371] VGR4114 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1525 precursor RNA, VGAM1526 precursor RNA, VGAM1757 precursor RNA, VGAM1758 precursor RNA, VGAM1771 precursor RNA, VGAM1774 precursor RNA, VGAM1775 precursor RNA and VGAM1780 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57372] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1525 RNA, VGAM1526 RNA, VGAM1757 RNA, VGAM1758 RNA, VGAM1771 RNA, VGAM1774 RNA, VGAM1775 RNA and VGAM1780 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57373] VGAM1525 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1525 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1525 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1525 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57374] VGAM1526 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1526 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1526 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1526 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57375] VGAM1757 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1757 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1757 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1757 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57376] VGAM1758 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1758 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1758 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1758 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57377] VGAM1771 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1771 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1771 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1771 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57378] VGAM1774 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1774 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1774 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1774 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57379] VGAM1775 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1775 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1775 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1775 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57380] VGAM1780 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1780 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1780 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1780 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57381] It is appreciated that a function of VGR4114 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4114 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4114 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4114 gene: VGAM1525 host target protein, VGAM1526 host target protein, VGAM1757 host target protein, VGAM1758 host target protein, VGAM1771 host target protein, VGAM1774 host target protein, VGAM1775 host target protein and VGAM1780 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1525, VGAM1526, VGAM1757, VGAM1758, VGAM1771, VGAM1774, VGAM1775 and VGAM1780

[57382] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4115(VGR4115) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57383] VGR4115 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4115 gene was detected is described hereinabove with reference to Figs. 6–15.

[57384] VGR4115 gene encodes VGR4115 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57385] VGR4115 precursor RNA folds spatially, forming VGR4115 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4115 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4115 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57386] VGR4115 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2836 precursor RNA, VGAM2924 precursor RNA, VGAM2925 precursor RNA, VGAM3100 precursor RNA, VGAM3101 precursor RNA, VGAM3232 precursor RNA, VGAM3301 precursor RNA and VGAM3361 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57387] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2836 RNA, VGAM2924 RNA, VGAM2925 RNA, VGAM3100 RNA, VGAM3101 RNA, VGAM3232 RNA, VGAM3301 RNA and VGAM3361 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57388] VGAM2836 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2836 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2836 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2836 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57389] VGAM2924 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2924 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2924 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2924 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57390] VGAM2925 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2925 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2925 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2925 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57391] VGAM3100 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3100 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3100 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3100 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57392] VGAM3101 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3101 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3101 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3101 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57393] VGAM3232 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3232 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3232 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3232 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57394] VGAM3301 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3301 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3301 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3301 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[57395] VGAM3361 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3361 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3361 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3361 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57396] It is appreciated that a function of VGR4115 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4115 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4115 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4115 gene: VGAM2836

host target protein, VGAM2924 host target protein, VGAM2925 host target protein, VGAM3100 host target protein, VGAM3101 host target protein, VGAM3232 host target protein, VGAM3301 host target protein and VGAM3361 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2836, VGAM2924, VGAM2925, VGAM3100, VGAM3101, VGAM3232, VGAM3301 and VGAM3361

[57397] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4116(VGR4116) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57398] VGR4116 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4116 gene was detected is described hereinabove with reference to Figs.

6-15.

[57399] VGR4116 gene encodes VGR4116 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57400] VGR4116 precursor RNA folds spatially, forming VGR4116 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4116 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4116 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57401] VGR4116 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3798 precursor RNA and VGAM3812 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECUR-

SOR RNA of Fig. 8.

[57402] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3798 RNA and VGAM3812 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57403] VGAM3798 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3798 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3798 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3798 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57404] VGAM3812 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3812 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3812 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3812 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57405] It is appreciated that a function of VGR4116 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4116 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4116 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4116 gene: VGAM3798 host target protein and VGAM3812 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated

hereinabove with reference to VGAM3798 and VGAM3812

[57406] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4117(VGR4117) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57407] VGR4117 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4117 gene was detected is described hereinabove with reference to Figs. 6–15.

[57408] VGR4117 gene encodes VGR4117 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57409] VGR4117 precursor RNA folds spatially, forming VGR4117 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4117 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4117 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57410] VGR4117 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM450 precursor RNA, VGAM451 precursor RNA, VGAM452 precursor RNA, VGAM455 precursor RNA, VGAM456 precursor RNA, VGAM457 precursor RNA and VGAM667 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57411] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM450 RNA, VGAM451 RNA, VGAM452 RNA, VGAM455 RNA, VGAM456 RNA, VGAM457 RNA and VGAM667 RNA re-

spectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57412] VGAM450 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM450 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM450 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM450 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57413] VGAM451 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM451 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM451 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM451 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57414] VGAM452 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM452 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM452 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM452 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57415] VGAM455 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM455 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM455 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM455 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57416] VGAM456 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM456 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM456 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM456 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57417] VGAM457 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM457 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM457 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM457 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57418] VGAM667 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM667 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM667 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM667 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57419] It is appreciated that a function of VGR4117 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4117 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4117 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4117 gene: VGAM450 host target protein, VGAM451 host target protein, VGAM452 host target protein, VGAM455 host target protein, VGAM456 host target protein, VGAM457 host target protein and VGAM667 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM450, VGAM451, VGAM452, VGAM455, VGAM456, VGAM457 and VGAM667

[57420] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4118(VGR4118) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57421] VGR4118 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4118 gene was detected is described hereinabove with reference to Figs. 6–15.

[57422] VGR4118 gene encodes VGR4118 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57423] VGR4118 precursor RNA folds spatially, forming VGR4118 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4118 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4118 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57424] VGR4118 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM668 precursor RNA, VGAM669 precursor

sor RNA, VGAM680 precursor RNA, VGAM681 precursor RNA, VGAM854 precursor RNA, VGAM855 precursor RNA, VGAM856 precursor RNA and VGAM857 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57425] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM668 RNA, VGAM669 RNA, VGAM680 RNA, VGAM681 RNA, VGAM854 RNA, VGAM855 RNA, VGAM856 RNA and VGAM857 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57426] VGAM668 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM668 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM668 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM668 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57427] VGAM669 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM669 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM669 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM669 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57428] VGAM680 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM680 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM680 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM680 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57429] VGAM681 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM681 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM681 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM681 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57430] VGAM854 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM854 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM854 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM854 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57431] VGAM855 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM855 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM855 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM855 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57432] VGAM856 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM856 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM856 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM856 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57433] VGAM857 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM857 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM857 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM857 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[57434] It is appreciated that a function of VGR4118 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4118 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4118 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4118 gene: VGAM668 host target protein, VGAM669 host target protein, VGAM680 host target protein, VGAM681 host target protein, VGAM854 host target protein, VGAM855 host target protein, VGAM856 host target protein and VGAM857 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM668, VGAM669, VGAM680, VGAM681, VGAM854, VGAM855, VGAM856 and VGAM857

[57435] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4119(VGR4119) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57436] VGR4119 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4119 gene was detected is described hereinabove with reference to Figs. 6-15.

[57437] VGR4119 gene encodes VGR4119 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57438] VGR4119 precursor RNA folds spatially, forming VGR4119 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4119 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4119 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57439] VGR4119 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM989 precursor RNA, VGAM992 precursor RNA, VGAM1278 precursor RNA, VGAM1552 precursor RNA, VGAM1640 precursor RNA, VGAM1824 precursor RNA, VGAM1831 precursor RNA and VGAM1832 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57440] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM989 RNA, VGAM992 RNA, VGAM1278 RNA, VGAM1552 RNA, VGAM1640 RNA, VGAM1824 RNA, VGAM1831 RNA and VGAM1832 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57441] VGAM989 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM989 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM989 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM989 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57442] VGAM992 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM992 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM992 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM992 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57443] VGAM1278 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1278 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1278 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1278 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57444] VGAM1552 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1552 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1552 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1552 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57445] VGAM1640 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1640 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1640 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1640 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57446] VGAM1824 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1824 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1824 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1824 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57447] VGAM1831 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1831 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1831 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1831 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57448] VGAM1832 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1832 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1832 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1832 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57449] It is appreciated that a function of VGR4119 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4119 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4119 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4119 gene: VGAM989 host target protein, VGAM992 host target protein, VGAM1278 host target protein, VGAM1552 host target protein, VGAM1640 host target protein, VGAM1824 host target protein, VGAM1831 host target protein and VGAM1832 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM989, VGAM992, VGAM1278, VGAM1552, VGAM1640, VGAM1824, VGAM1831 and VGAM1832

[57450] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4120(VGR4120) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57451] VGR4120 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4120 gene was detected is described hereinabove with reference to Figs. 6–15.

[57452] VGR4120 gene encodes VGR4120 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57453] VGR4120 precursor RNA folds spatially, forming VGR4120 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4120 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4120 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57454] VGR4120 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2024 precursor RNA, VGAM2025 precursor RNA, VGAM2291 precursor RNA, VGAM2292 precursor RNA, VGAM2750 precursor RNA, VGAM2751 precursor RNA, VGAM2752 precursor RNA and VGAM2958 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57455] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2024 RNA, VGAM2025 RNA, VGAM2291 RNA, VGAM2292 RNA, VGAM2750 RNA, VGAM2751 RNA, VGAM2752 RNA and VGAM2958 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57456] VGAM2024 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2024 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2024 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2024 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57457] VGAM2025 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2025 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2025 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2025 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57458] VGAM2291 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2291 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2291 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2291 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57459] VGAM2292 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2292 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2292 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2292 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57460] VGAM2750 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2750 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2750 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2750 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57461] VGAM2751 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2751 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2751 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2751 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57462] VGAM2752 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2752 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2752 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2752 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[57463] VGAM2958 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2958 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2958 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2958 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57464] It is appreciated that a function of VGR4120 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4120 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4120 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4120 gene: VGAM2024

host target protein, VGAM2025 host target protein, VGAM2291 host target protein, VGAM2292 host target protein, VGAM2750 host target protein, VGAM2751 host target protein, VGAM2752 host target protein and VGAM2958 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2024, VGAM2025, VGAM2291, VGAM2292, VGAM2750, VGAM2751, VGAM2752 and VGAM2958

[57465] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4121(VGR4121) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57466] VGR4121 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4121 gene was detected is described hereinabove with reference to Figs.

6-15.

[57467] VGR4121 gene encodes VGR4121 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57468] VGR4121 precursor RNA folds spatially, forming VGR4121 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4121 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4121 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57469] VGR4121 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3013 precursor RNA, VGAM3014 precursor RNA, VGAM3039 precursor RNA, VGAM3077 precursor RNA, VGAM3078 precursor RNA, VGAM3163 precursor RNA, VGAM3164 precursor RNA and VGAM3413 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57470] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3013 RNA, VGAM3014 RNA, VGAM3039 RNA, VGAM3077 RNA, VGAM3078 RNA, VGAM3163 RNA, VGAM3164 RNA and VGAM3413 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57471] VGAM3013 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3013 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3013 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3013 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57472] VGAM3014 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3014 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3014 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3014 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57473] VGAM3039 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3039 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3039 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3039 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57474] VGAM3077 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3077 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3077 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3077 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57475] VGAM3078 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3078 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3078 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3078 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57476] VGAM3163 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3163 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3163 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3163 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57477] VGAM3164 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3164 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3164 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3164 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57478] VGAM3413 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3413 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3413 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3413 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57479] It is appreciated that a function of VGR4121 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4121 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4121 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4121 gene: VGAM3013 host target protein, VGAM3014 host target protein, VGAM3039 host target protein, VGAM3077 host target protein, VGAM3078 host target protein, VGAM3163 host target protein, VGAM3164 host target protein and VGAM3413 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3013, VGAM3014, VGAM3039, VGAM3077, VGAM3078, VGAM3163, VGAM3164 and VGAM3413

[57480] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4122(VGR4122) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57481] VGR4122 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4122 gene was detected is described hereinabove with reference to Figs. 6–15.

[57482] VGR4122 gene encodes VGR4122 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57483] VGR4122 precursor RNA folds spatially, forming VGR4122 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4122 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4122 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57484] VGR4122 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3660 precursor RNA and VGAM3661 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57485] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3660 RNA and VGAM3661 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57486] VGAM3660 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3660 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3660 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM3660 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57487] VGAM3661 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3661 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3661 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3661 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57488] It is appreciated that a function of VGR4122 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4122 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4122 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4122 gene: VGAM3660 host target protein and VGAM3661 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3660 and VGAM3661

[57489] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4123(VGR4123) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57490] VGR4123 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4123 gene was detected is described hereinabove with reference to Figs. 6–15.

[57491] VGR4123 gene encodes VGR4123 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[57492] VGR4123 precursor RNA folds spatially, forming VGR4123 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4123 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4123 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57493] VGR4123 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM373 precursor RNA, VGAM374 precursor RNA, VGAM412 precursor RNA, VGAM414 precursor RNA, VGAM415 precursor RNA, VGAM416 precursor RNA, VGAM417 precursor RNA and VGAM418 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively,

each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57494] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM373 RNA, VGAM374 RNA, VGAM412 RNA, VGAM414 RNA, VGAM415 RNA, VGAM416 RNA, VGAM417 RNA and VGAM418 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57495] VGAM373 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM373 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM373 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM373 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57496] VGAM374 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM374 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM374 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM374 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57497] VGAM412 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM412 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM412 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM412 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57498] VGAM414 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM414 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM414 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM414 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57499] VGAM415 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM415 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM415 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM415 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57500] VGAM416 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM416 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM416 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM416 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57501] VGAM417 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM417 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM417 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM417 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57502] VGAM418 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM418 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM418 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM418 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57503] It is appreciated that a function of VGR4123 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4123 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4123

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4123 gene: VGAM373 host target protein, VGAM374 host target protein, VGAM412 host target protein, VGAM414 host target protein, VGAM415 host target protein, VGAM416 host target protein, VGAM417 host target protein and VGAM418 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM373, VGAM374, VGAM412, VGAM414, VGAM415, VGAM416, VGAM417 and VGAM418

[57504] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4124(VGR4124) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57505] VGR4124 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4124 gene was detected is described hereinabove with reference to Figs. 6–15.

[57506] VGR4124 gene encodes VGR4124 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57507] VGR4124 precursor RNA folds spatially, forming VGR4124 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4124 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4124 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57508] VGR4124 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM419 precursor RNA, VGAM420 precursor RNA, VGAM421 precursor RNA, VGAM422 precursor

RNA, VGAM496 precursor RNA, VGAM1200 precursor RNA, VGAM1201 precursor RNA and VGAM1202 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57509] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM419 RNA, VGAM420 RNA, VGAM421 RNA, VGAM422 RNA, VGAM496 RNA, VGAM1200 RNA, VGAM1201 RNA and VGAM1202 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57510] VGAM419 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM419 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM419 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM419 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57511] VGAM420 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM420 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM420 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM420 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57512] VGAM421 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM421 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM421 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM421 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57513] VGAM422 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM422 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM422 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM422 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57514] VGAM496 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM496 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM496 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM496 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57515] VGAM1200 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1200 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1200 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1200 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57516] VGAM1201 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1201 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1201 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1201 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57517] VGAM1202 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1202 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1202 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1202 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57518] It is appreciated that a function of VGR4124 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4124 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4124 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4124 gene: VGAM419 host target protein, VGAM420 host target protein, VGAM421 host target protein, VGAM422 host target protein, VGAM496 host target protein, VGAM1200 host target protein, VGAM1201 host target protein and VGAM1202 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM419, VGAM420, VGAM421, VGAM422, VGAM496, VGAM1200, VGAM1201 and VGAM1202

[57519] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4125(VGR4125) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57520] VGR4125 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4125 gene was detected is described hereinabove with reference to Figs. 6–15.

[57521] VGR4125 gene encodes VGR4125 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57522] VGR4125 precursor RNA folds spatially, forming VGR4125 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4125 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4125 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[57523] VGR4125 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1326 precursor RNA, VGAM1327 precursor RNA, VGAM1328 precursor RNA, VGAM1343 precursor RNA, VGAM1346 precursor RNA, VGAM1348 precursor RNA, VGAM1750 precursor RNA and VGAM1753 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57524] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1326 RNA, VGAM1327 RNA, VGAM1328 RNA, VGAM1343 RNA, VGAM1346 RNA, VGAM1348 RNA, VGAM1750 RNA and VGAM1753 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57525] VGAM1326 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1326 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1326 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1326 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57526] VGAM1327 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1327 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1327 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1327 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57527] VGAM1328 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1328 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1328 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1328 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57528] VGAM1343 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1343 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1343 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1343 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57529] VGAM1346 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1346 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1346 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1346 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57530] VGAM1348 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1348 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1348 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1348 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57531] VGAM1750 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1750 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1750 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1750 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57532] VGAM1753 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1753 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1753 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1753 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57533] It is appreciated that a function of VGR4125 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4125 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4125 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4125 gene: VGAM1326 host target protein, VGAM1327 host target protein, VGAM1328 host target protein, VGAM1343 host target protein, VGAM1346 host target protein, VGAM1348 host target protein, VGAM1750 host target protein and VGAM1753 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1326, VGAM1327, VGAM1328, VGAM1343, VGAM1346, VGAM1348, VGAM1750 and VGAM1753

[57534] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4126(VGR4126) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57535] VGR4126 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4126 gene was detected is described hereinabove with reference to Figs. 6–15.

[57536] VGR4126 gene encodes VGR4126 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57537] VGR4126 precursor RNA folds spatially, forming VGR4126 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4126 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4126 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57538] VGR4126 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1754 precursor RNA, VGAM1756 precursor RNA, VGAM1885 precursor RNA, VGAM1889 precursor RNA, VGAM1893 precursor RNA, VGAM1937 precursor RNA, VGAM1940 precursor RNA and VGAM1941 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57539] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1754 RNA, VGAM1756 RNA, VGAM1885 RNA, VGAM1889 RNA, VGAM1893 RNA, VGAM1937 RNA, VGAM1940 RNA and VGAM1941 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57540] VGAM1754 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1754 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1754 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1754 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57541] VGAM1756 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM1756 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1756 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1756 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57542] VGAM1885 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1885 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1885 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1885 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57543] VGAM1889 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1889 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1889 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1889 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57544] VGAM1893 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1893 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1893 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1893 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57545] VGAM1937 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1937 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1937 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1937 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57546] VGAM1940 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1940 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1940 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1940 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[57547] VGAM1941 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1941 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1941 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1941 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57548] It is appreciated that a function of VGR4126 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4126 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4126 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4126 gene: VGAM1754

host target protein, VGAM1756 host target protein, VGAM1885 host target protein, VGAM1889 host target protein, VGAM1893 host target protein, VGAM1937 host target protein, VGAM1940 host target protein and VGAM1941 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1754, VGAM1756, VGAM1885, VGAM1889, VGAM1893, VGAM1937, VGAM1940 and VGAM1941

[57549] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4127(VGR4127) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57550] VGR4127 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4127 gene was detected is described hereinabove with reference to Figs.

6-15.

[57551] VGR4127 gene encodes VGR4127 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57552] VGR4127 precursor RNA folds spatially, forming VGR4127 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4127 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4127 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57553] VGR4127 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1942 precursor RNA, VGAM2022 precursor RNA, VGAM2052 precursor RNA, VGAM2062 precursor RNA, VGAM2063 precursor RNA, VGAM2136 precursor RNA, VGAM2137 precursor RNA and VGAM2138 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57554] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1942 RNA, VGAM2022 RNA, VGAM2052 RNA, VGAM2062 RNA, VGAM2063 RNA, VGAM2136 RNA, VGAM2137 RNA and VGAM2138 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57555] VGAM1942 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1942 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1942 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1942 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57556] VGAM2022 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2022 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2022 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2022 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57557] VGAM2052 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2052 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2052 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2052 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57558] VGAM2062 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2062 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2062 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2062 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57559] VGAM2063 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2063 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2063 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2063 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57560] VGAM2136 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2136 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2136 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2136 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57561] VGAM2137 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2137 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2137 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2137 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57562] VGAM2138 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2138 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2138 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2138 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57563] It is appreciated that a function of VGR4127 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4127 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4127 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4127 gene: VGAM1942 host target protein, VGAM2022 host target protein, VGAM2052 host target protein, VGAM2062 host target protein, VGAM2063 host target protein, VGAM2136 host target protein, VGAM2137 host target protein and VGAM2138 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1942, VGAM2022, VGAM2052, VGAM2062, VGAM2063, VGAM2136, VGAM2137 and VGAM2138

[57564] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4128(VGR4128) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57565] VGR4128 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4128 gene was detected is described hereinabove with reference to Figs. 6–15.

[57566] VGR4128 gene encodes VGR4128 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57567] VGR4128 precursor RNA folds spatially, forming VGR4128 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4128 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4128 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57568] VGR4128 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2139 precursor RNA, VGAM2248 precursor RNA, VGAM2432 precursor RNA, VGAM2433 precursor RNA, VGAM2454 precursor RNA, VGAM2455 precursor RNA, VGAM2768 precursor RNA and VGAM3302 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57569] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2139 RNA, VGAM2248 RNA, VGAM2432 RNA, VGAM2433 RNA, VGAM2454 RNA, VGAM2455 RNA, VGAM2768 RNA and VGAM3302 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57570] VGAM2139 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2139 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2139 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2139 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57571] VGAM2248 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2248 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2248 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2248 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[57572] VGAM2432 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2432 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2432 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2432 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57573] VGAM2433 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2433 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2433 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2433 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57574] VGAM2454 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2454 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2454 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2454 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57575] VGAM2455 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2455 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2455 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2455 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57576] VGAM2768 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2768 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2768 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2768 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57577] VGAM3302 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3302 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3302 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM3302 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[57578] It is appreciated that a function of VGR4128 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4128 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4128 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4128 gene: VGAM2139 host target protein, VGAM2248 host target protein, VGAM2432 host target protein, VGAM2433 host target protein, VGAM2454 host target protein, VGAM2455 host target protein, VGAM2768 host target protein and VGAM3302 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2139, VGAM2248, VGAM2432,

VGAM2433, VGAM2454, VGAM2455, VGAM2768 and VGAM3302

[57579] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4129(VGR4129) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57580] VGR4129 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4129 gene was detected is described hereinabove with reference to Figs. 6–15.

[57581] VGR4129 gene encodes VGR4129 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57582] VGR4129 precursor RNA folds spatially, forming VGR4129 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4129 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4129 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57583] VGR4129 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM3330 precursor RNA, VGAM3331 precursor RNA, VGAM3377 precursor RNA, VGAM3653 precursor RNA and VGAM3709 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57584] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3330 RNA, VGAM3331 RNA, VGAM3377 RNA, VGAM3653 RNA and VGAM3709 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA,

VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57585] VGAM3330 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3330 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3330 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3330 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57586] VGAM3331 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3331 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3331 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM3331 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57587] VGAM3377 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3377 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3377 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3377 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57588] VGAM3653 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3653 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3653 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM3653 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57589] VGAM3709 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3709 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3709 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3709 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57590] It is appreciated that a function of VGR4129 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4129 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4129 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4129 gene: VGAM3330 host target protein, VGAM3331 host target protein, VGAM3377 host target protein, VGAM3653 host target protein and VGAM3709 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3330, VGAM3331, VGAM3377, VGAM3653 and VGAM3709

[57591] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4130(VGR4130) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57592] VGR4130 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4130 gene was detected is described hereinabove with reference to Figs.

6-15.

[57593] VGR4130 gene encodes VGR4130 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57594] VGR4130 precursor RNA folds spatially, forming VGR4130 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4130 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4130 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57595] VGR4130 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2711 precursor RNA, VGAM2723 precursor RNA and VGAM3043 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA

segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57596] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2711 RNA, VGAM2723 RNA and VGAM3043 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57597] VGAM2711 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2711 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2711 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2711 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57598] VGAM2723 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2723 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2723 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2723 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57599] VGAM3043 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3043 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3043 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3043 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57600] It is appreciated that a function of VGR4130 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4130 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4130 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4130 gene: VGAM2711 host target protein, VGAM2723 host target protein and VGAM3043 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2711, VGAM2723 and VGAM3043

[57601] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4131(VGR4131) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57602] VGR4131 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4131 gene was detected is described hereinabove with reference to Figs. 6–15.

[57603] VGR4131 gene encodes VGR4131 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57604] VGR4131 precursor RNA folds spatially, forming VGR4131 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4131 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4131 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57605] VGR4131 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2712 precursor RNA and VGAM2713

precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57606] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2712 RNA and VGAM2713 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57607] VGAM2712 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2712 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2712 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2712 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[57608] VGAM2713 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2713 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2713 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2713 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57609] It is appreciated that a function of VGR4131 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4131 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4131 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4131 gene: VGAM2712

host target protein and VGAM2713 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2712 and VGAM2713

[57610] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4132(VGR4132) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57611] VGR4132 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4132 gene was detected is described hereinabove with reference to Figs. 6–15.

[57612] VGR4132 gene encodes VGR4132 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57613] VGR4132 precursor RNA folds spatially, forming VGR4132 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4132 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4132 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57614] VGR4132 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM852 precursor RNA, VGAM853 precursor RNA, VGAM1891 precursor RNA, VGAM1892 precursor RNA and VGAM3389 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57615] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM852

RNA, VGAM853 RNA, VGAM1891 RNA, VGAM1892 RNA and VGAM3389 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57616] VGAM852 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM852 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM852 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM852 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57617] VGAM853 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM853 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM853 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM853 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57618] VGAM1891 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1891 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1891 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1891 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57619] VGAM1892 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1892 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1892 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1892 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57620] VGAM3389 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3389 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3389 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3389 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57621] It is appreciated that a function of VGR4132 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4132 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4132 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4132 gene: VGAM852 host target protein, VGAM853 host target protein, VGAM1891 host target protein, VGAM1892 host target protein and VGAM3389 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM852, VGAM853, VGAM1891, VGAM1892 and VGAM3389

[57622] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4133(VGR4133) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57623] VGR4133 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4133 gene was detected is described hereinabove with reference to Figs. 6–15.

[57624] VGR4133 gene encodes VGR4133 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57625] VGR4133 precursor RNA folds spatially, forming VGR4133 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4133 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4133 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57626] VGR4133 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM971 precursor RNA, VGAM973 precursor RNA, VGAM974 precursor RNA and VGAM3220 pre–

cursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57627] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM971 RNA, VGAM973 RNA, VGAM974 RNA and VGAM3220 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57628] VGAM971 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM971 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM971 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM971 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57629] VGAM973 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM973 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM973 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM973 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57630] VGAM974 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM974 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM974 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM974 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57631] VGAM3220 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3220 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3220 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3220 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57632] It is appreciated that a function of VGR4133 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4133 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4133 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4133 gene: VGAM971 host target protein, VGAM973 host target protein, VGAM974 host target protein and VGAM3220 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM971, VGAM973, VGAM974 and VGAM3220

[57633] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4134(VGR4134) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57634] VGR4134 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4134 gene was detected is described hereinabove with reference to Figs. 6-15.

[57635] VGR4134 gene encodes VGR4134 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57636] VGR4134 precursor RNA folds spatially, forming VGR4134 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4134 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4134 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57637] VGR4134 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1813 precursor RNA, VGAM3181 precursor RNA and VGAM3221 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57638] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1813 RNA, VGAM3181 RNA and VGAM3221 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57639] VGAM1813 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1813 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1813 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1813 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57640] VGAM3181 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3181 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3181 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3181 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57641] VGAM3221 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3221 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3221 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3221 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57642] It is appreciated that a function of VGR4134 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4134 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4134 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4134 gene: VGAM1813 host target protein, VGAM3181 host target protein and VGAM3221 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1813, VGAM3181 and VGAM3221

[57643] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4135(VGR4135) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57644] VGR4135 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4135 gene was detected is described hereinabove with reference to Figs. 6–15.

[57645] VGR4135 gene encodes VGR4135 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57646] VGR4135 precursor RNA folds spatially, forming VGR4135 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4135 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4135 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57647] VGR4135 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1001 precursor RNA, VGAM1002 precursor RNA, VGAM1003 precursor RNA, VGAM1971 precursor RNA and VGAM1972 precursor RNA, herein

schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57648] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1001 RNA, VGAM1002 RNA, VGAM1003 RNA, VGAM1971 RNA and VGAM1972 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57649] VGAM1001 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1001 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1001 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1001 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57650] VGAM1002 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1002 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1002 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1002 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57651] VGAM1003 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1003 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1003 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM1003 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57652] VGAM1971 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1971 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1971 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1971 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57653] VGAM1972 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1972 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1972 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM1972 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57654] It is appreciated that a function of VGR4135 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4135 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4135 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4135 gene: VGAM1001 host target protein, VGAM1002 host target protein, VGAM1003 host target protein, VGAM1971 host target protein and VGAM1972 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1001, VGAM1002, VGAM1003, VGAM1971 and VGAM1972

[57655] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4136(VGR4136) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57656] VGR4136 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4136 gene was detected is described hereinabove with reference to Figs. 6–15.

[57657] VGR4136 gene encodes VGR4136 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57658] VGR4136 precursor RNA folds spatially, forming VGR4136 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4136 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4136 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57659] VGR4136 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3281 precursor RNA and VGAM3580 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57660] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3281 RNA and VGAM3580 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57661] VGAM3281 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3281 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3281 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3281 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57662] VGAM3580 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3580 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3580 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3580 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57663] It is appreciated that a function of VGR4136 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4136 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4136 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4136 gene: VGAM3281 host target protein and VGAM3580 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3281 and VGAM3580

[57664] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4137(VGR4137) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57665] VGR4137 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4137 gene was

detected is described hereinabove with reference to Figs. 6–15.

[57666] VGR4137 gene encodes VGR4137 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57667] VGR4137 precursor RNA folds spatially, forming VGR4137 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4137 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4137 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57668] VGR4137 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1155 precursor RNA and VGAM1158 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57669] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1155 RNA and VGAM1158 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57670] VGAM1155 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1155 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1155 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1155 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57671] VGAM1158 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM1158 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1158 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1158 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57672] It is appreciated that a function of VGR4137 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4137 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4137 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4137 gene: VGAM1155 host target protein and VGAM1158 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM1155 and VGAM1158

[57673] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4138(VGR4138) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57674] VGR4138 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4138 gene was detected is described hereinabove with reference to Figs. 6–15.

[57675] VGR4138 gene encodes VGR4138 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57676] VGR4138 precursor RNA folds spatially, forming VGR4138 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4138 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4138 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57677] VGR4138 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM515 precursor RNA, VGAM516 precursor RNA, VGAM517 precursor RNA, VGAM3536 precursor RNA and VGAM3537 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57678] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM515 RNA, VGAM516 RNA, VGAM517 RNA, VGAM3536 RNA and VGAM3537 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57679] VGAM515 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM515 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM515 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM515 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57680] VGAM516 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM516 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM516 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM516 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57681] VGAM517 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM517 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM517 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM517 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57682] VGAM3536 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3536 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3536 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM3536 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57683] VGAM3537 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3537 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3537 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3537 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57684] It is appreciated that a function of VGR4138 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4138 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4138 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4138 gene: VGAM515 host target protein, VGAM516 host target protein, VGAM517 host target protein, VGAM3536 host target protein and VGAM3537 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM515, VGAM516, VGAM517, VGAM3536 and VGAM3537

[57685] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4139(VGR4139) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57686] VGR4139 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4139 gene was detected is described hereinabove with reference to Figs.

6-15.

[57687] VGR4139 gene encodes VGR4139 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57688] VGR4139 precursor RNA folds spatially, forming VGR4139 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4139 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4139 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57689] VGR4139 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2628 precursor RNA, VGAM2629 precursor RNA, VGAM3120 precursor RNA, VGAM3184 precursor RNA and VGAM3539 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and

VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57690] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2628 RNA, VGAM2629 RNA, VGAM3120 RNA, VGAM3184 RNA and VGAM3539 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57691] VGAM2628 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2628 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2628 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2628 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57692] VGAM2629 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2629 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2629 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2629 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57693] VGAM3120 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3120 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3120 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3120 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[57694] VGAM3184 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3184 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3184 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3184 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57695] VGAM3539 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3539 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3539 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3539 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57696] It is appreciated that a function of VGR4139 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4139 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4139 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4139 gene: VGAM2628 host target protein, VGAM2629 host target protein, VGAM3120 host target protein, VGAM3184 host target protein and VGAM3539 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2628, VGAM2629, VGAM3120, VGAM3184 and VGAM3539

[57697] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4140(VGR4140) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57698] VGR4140 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4140 gene was detected is described hereinabove with reference to Figs. 6–15.

[57699] VGR4140 gene encodes VGR4140 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57700] VGR4140 precursor RNA folds spatially, forming VGR4140 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4140 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4140 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[57701] VGR4140 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3182 precursor RNA, VGAM3183 precursor RNA and VGAM3198 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57702] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3182 RNA, VGAM3183 RNA and VGAM3198 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57703] VGAM3182 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3182 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3182 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3182 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57704] VGAM3183 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3183 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3183 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3183 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57705] VGAM3198 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3198 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3198 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3198 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57706] It is appreciated that a function of VGR4140 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4140 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4140 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4140 gene: VGAM3182 host target protein, VGAM3183 host target protein and VGAM3198 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM3182, VGAM3183 and VGAM3198

[57707] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4141(VGR4141) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57708] VGR4141 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4141 gene was detected is described hereinabove with reference to Figs. 6–15.

[57709] VGR4141 gene encodes VGR4141 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57710] VGR4141 precursor RNA folds spatially, forming VGR4141 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4141 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4141 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57711] VGR4141 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3146 precursor RNA and VGAM3224 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57712] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3146 RNA and VGAM3224 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57713] VGAM3146 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM3146 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3146 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3146 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57714] VGAM3224 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3224 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3224 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3224 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57715] It is appreciated that a function of VGR4141 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4141 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4141 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4141 gene: VGAM3146 host target protein and VGAM3224 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3146 and VGAM3224

[57716] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4142(VGR4142) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57717] VGR4142 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4142 gene was detected is described hereinabove with reference to Figs. 6–15.

[57718] VGR4142 gene encodes VGR4142 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57719] VGR4142 precursor RNA folds spatially, forming VGR4142 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4142 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4142 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57720] VGR4142 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2819 precursor RNA and VGAM3149 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57721] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2819 RNA and VGAM3149 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57722] VGAM2819 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2819 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2819 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2819 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57723] VGAM3149 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3149 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3149 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3149 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57724] It is appreciated that a function of VGR4142 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4142 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4142 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4142 gene: VGAM2819 host target protein and VGAM3149 host target protein,

herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2819 and VGAM3149

[57725] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4143(VGR4143) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57726] VGR4143 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4143 gene was detected is described hereinabove with reference to Figs. 6–15.

[57727] VGR4143 gene encodes VGR4143 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57728] VGR4143 precursor RNA folds spatially, forming VGR4143 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4143 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4143 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57729] VGR4143 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM940 precursor RNA, VGAM941 precursor RNA, VGAM3271 precursor RNA and VGAM3538 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57730] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM940 RNA, VGAM941 RNA, VGAM3271 RNA and VGAM3538 RNA respectively, herein schematically represented by

VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57731] VGAM940 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM940 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM940 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM940 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57732] VGAM941 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM941 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM941 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM941 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57733] VGAM3271 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3271 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3271 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3271 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57734] VGAM3538 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3538 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3538 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3538 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57735] It is appreciated that a function of VGR4143 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4143 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4143 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4143 gene: VGAM940 host target protein, VGAM941 host target protein, VGAM3271 host target protein and VGAM3538 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM940, VGAM941, VGAM3271 and VGAM3538

[57736] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4144(VGR4144) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57737] VGR4144 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4144 gene was detected is described hereinabove with reference to Figs. 6–15.

[57738] VGR4144 gene encodes VGR4144 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57739] VGR4144 precursor RNA folds spatially, forming VGR4144 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4144 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4144 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57740] VGR4144 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM734 precursor RNA, VGAM1594 precursor RNA, VGAM1595 precursor RNA, VGAM1596 precursor RNA and VGAM1598 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57741] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM734 RNA, VGAM1594 RNA, VGAM1595 RNA, VGAM1596 RNA and VGAM1598 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57742] VGAM734 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM734 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM734 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM734 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57743] VGAM1594 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1594 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1594 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1594 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57744] VGAM1595 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1595 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1595 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1595 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57745] VGAM1596 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1596 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1596 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1596 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[57746] VGAM1598 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1598 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1598 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1598 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57747] It is appreciated that a function of VGR4144 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4144 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4144 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4144 gene: VGAM734 host

target protein, VGAM1594 host target protein, VGAM1595 host target protein, VGAM1596 host target protein and VGAM1598 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM734, VGAM1594, VGAM1595, VGAM1596 and VGAM1598

[57748] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4145(VGR4145) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57749] VGR4145 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4145 gene was detected is described hereinabove with reference to Figs. 6–15.

[57750] VGR4145 gene encodes VGR4145 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[57751] VGR4145 precursor RNA folds spatially, forming VGR4145 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4145 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4145 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57752] VGR4145 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1974 precursor RNA, VGAM1975 precursor RNA, VGAM1976 precursor RNA and VGAM3376 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57753] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1974 RNA, VGAM1975 RNA, VGAM1976 RNA and VGAM3376 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57754] VGAM1974 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1974 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1974 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1974 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57755] VGAM1975 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1975 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1975 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1975 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57756] VGAM1976 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1976 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1976 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1976 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57757] VGAM3376 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM3376 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3376 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3376 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57758] It is appreciated that a function of VGR4145 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4145 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4145 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4145 gene: VGAM1974 host target protein, VGAM1975 host target protein, VGAM1976 host target protein and VGAM3376 host target protein, herein schematically represented by VGAM1 HOST

TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1974, VGAM1975, VGAM1976 and VGAM3376

[57759] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4146(VGR4146) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57760] VGR4146 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4146 gene was detected is described hereinabove with reference to Figs. 6–15.

[57761] VGR4146 gene encodes VGR4146 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57762] VGR4146 precursor RNA folds spatially, forming VGR4146 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4146 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4146 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57763] VGR4146 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1652 precursor RNA, VGAM1883 precursor RNA, VGAM1884 precursor RNA, VGAM1886 precursor RNA, VGAM1887 precursor RNA, VGAM1888 precursor RNA and VGAM2574 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57764] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1652 RNA, VGAM1883 RNA, VGAM1884 RNA, VGAM1886 RNA, VGAM1887 RNA, VGAM1888 RNA and VGAM2574 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57765] VGAM1652 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1652 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1652 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1652 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57766] VGAM1883 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1883 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1883 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1883 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57767] VGAM1884 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1884 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1884 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1884 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57768] VGAM1886 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1886 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1886 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1886 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57769] VGAM1887 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1887 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1887 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1887 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57770] VGAM1888 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM1888 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1888 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1888 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57771] VGAM2574 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2574 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2574 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2574 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[57772] It is appreciated that a function of VGR4146 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4146 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4146 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4146 gene: VGAM1652 host target protein, VGAM1883 host target protein, VGAM1884 host target protein, VGAM1886 host target protein, VGAM1887 host target protein, VGAM1888 host target protein and VGAM2574 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1652, VGAM1883, VGAM1884, VGAM1886, VGAM1887, VGAM1888 and VGAM2574

[57773] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4147(VGR4147) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57774] VGR4147 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4147 gene was detected is described hereinabove with reference to Figs. 6–15.

[57775] VGR4147 gene encodes VGR4147 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57776] VGR4147 precursor RNA folds spatially, forming VGR4147 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4147 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4147 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57777] VGR4147 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM888 precursor RNA, VGAM1574 precursor RNA and VGAM1575 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57778] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM888 RNA, VGAM1574 RNA and VGAM1575 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57779] VGAM888 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM888 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM888 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM888 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57780] VGAM1574 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1574 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1574 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1574 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57781] VGAM1575 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1575 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1575 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1575 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57782] It is appreciated that a function of VGR4147 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4147 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4147 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4147 gene: VGAM888 host target protein, VGAM1574 host target protein and VGAM1575 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM888, VGAM1574 and VGAM1575

[57783] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4148(VGR4148) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57784] VGR4148 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4148 gene was detected is described hereinabove with reference to Figs. 6–15.

[57785] VGR4148 gene encodes VGR4148 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57786] VGR4148 precursor RNA folds spatially, forming VGR4148 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4148 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4148 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57787] VGR4148 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM979 precursor RNA, VGAM1192 precursor RNA, VGAM1195 precursor RNA, VGAM1196 precursor RNA, VGAM1197 precursor RNA and VGAM1198 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57788] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM979 RNA, VGAM1192 RNA, VGAM1195 RNA, VGAM1196 RNA, VGAM1197 RNA and VGAM1198 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA

respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57789] VGAM979 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM979 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM979 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM979 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57790] VGAM1192 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1192 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1192 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1192 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57791] VGAM1195 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1195 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1195 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1195 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57792] VGAM1196 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1196 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1196 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1196 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57793] VGAM1197 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1197 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1197 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1197 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57794] VGAM1198 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1198 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1198 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1198 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57795] It is appreciated that a function of VGR4148 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4148 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4148 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4148 gene: VGAM979 host target protein, VGAM1192 host target protein, VGAM1195 host target protein, VGAM1196 host target protein, VGAM1197 host target protein and VGAM1198 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM979, VGAM1192, VGAM1195, VGAM1196, VGAM1197 and

VGAM1198

[57796] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4149(VGR4149) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57797] VGR4149 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4149 gene was detected is described hereinabove with reference to Figs. 6–15.

[57798] VGR4149 gene encodes VGR4149 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57799] VGR4149 precursor RNA folds spatially, forming VGR4149 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4149 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4149 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57800] VGR4149 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM700 precursor RNA, VGAM702 precursor RNA and VGAM3127 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57801] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM700 RNA, VGAM702 RNA and VGAM3127 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57802] VGAM700 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM700 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM700 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM700 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57803] VGAM702 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM702 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM702 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM702 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57804] VGAM3127 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3127 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3127 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3127 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57805] It is appreciated that a function of VGR4149 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4149 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4149 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4149 gene: VGAM700 host target protein, VGAM702 host target protein and VGAM3127 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM700, VGAM702 and VGAM3127

[57806] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4150(VGR4150) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57807] VGR4150 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4150 gene was detected is described hereinabove with reference to Figs. 6–15.

[57808] VGR4150 gene encodes VGR4150 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57809] VGR4150 precursor RNA folds spatially, forming VGR4150 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4150 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4150 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57810] VGR4150 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1438 precursor RNA and VGAM1443 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57811] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1438 RNA and VGAM1443 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM

RNA of Fig. 8.

[57812] VGAM1438 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1438 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1438 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1438 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57813] VGAM1443 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1443 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1443 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1443 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57814] It is appreciated that a function of VGR4150 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4150 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4150 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4150 gene: VGAM1438 host target protein and VGAM1443 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1438 and VGAM1443

[57815] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4151(VGR4151) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[57816] VGR4151 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4151 gene was detected is described hereinabove with reference to Figs. 6–15.

[57817] VGR4151 gene encodes VGR4151 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57818] VGR4151 precursor RNA folds spatially, forming VGR4151 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4151 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4151 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57819] VGR4151 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2637 precursor RNA, VGAM3117 precursor RNA, VGAM3230 precursor RNA, VGAM3231 precursor RNA and VGAM3541 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57820] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2637 RNA, VGAM3117 RNA, VGAM3230 RNA, VGAM3231 RNA and VGAM3541 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57821] VGAM2637 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2637 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2637 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2637 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57822] VGAM3117 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3117 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3117 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3117 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57823] VGAM3230 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3230 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3230 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3230 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57824] VGAM3231 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3231 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3231 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3231 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57825] VGAM3541 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3541 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3541 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3541 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57826] It is appreciated that a function of VGR4151 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4151 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4151 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4151 gene: VGAM2637 host target protein, VGAM3117 host target protein, VGAM3230 host target protein, VGAM3231 host target protein and VGAM3541 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2637, VGAM3117, VGAM3230, VGAM3231 and VGAM3541

[57827] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4152(VGR4152) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57828] VGR4152 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4152 gene was detected is described hereinabove with reference to Figs. 6–15.

[57829] VGR4152 gene encodes VGR4152 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57830] VGR4152 precursor RNA folds spatially, forming VGR4152 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4152 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4152 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57831] VGR4152 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2743 precursor RNA and VGAM3128 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57832] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2743 RNA and VGAM3128 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57833] VGAM2743 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2743 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2743 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2743 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57834] VGAM3128 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3128 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3128 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3128 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[57835] It is appreciated that a function of VGR4152 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4152 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4152 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4152 gene: VGAM2743 host target protein and VGAM3128 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2743 and VGAM3128

[57836] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4153(VGR4153) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[57837] VGR4153 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4153 gene was detected is described hereinabove with reference to Figs. 6–15.

[57838] VGR4153 gene encodes VGR4153 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57839] VGR4153 precursor RNA folds spatially, forming VGR4153 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4153 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4153 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[57840] VGR4153 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM pre–

cursor RNAs, VGAM877 precursor RNA and VGAM878 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57841] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM877 RNA and VGAM878 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57842] VGAM877 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM877 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM877 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM877 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57843] VGAM878 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM878 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM878 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM878 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57844] It is appreciated that a function of VGR4153 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4153 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4153 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4153 gene: VGAM877 host target protein and VGAM878 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM877 and VGAM878

[57845] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4154(VGR4154) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57846] VGR4154 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4154 gene was detected is described hereinabove with reference to Figs. 6-15.

[57847] VGR4154 gene encodes VGR4154 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57848] VGR4154 precursor RNA folds spatially, forming VGR4154

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4154 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4154 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57849] VGR4154 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM625 precursor RNA, VGAM628 precursor RNA and VGAM3804 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57850] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM625 RNA, VGAM628 RNA and VGAM3804 RNA respectively,

herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57851] VGAM625 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM625 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM625 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM625 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57852] VGAM628 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM628 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM628 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM628 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57853] VGAM3804 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3804 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3804 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3804 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57854] It is appreciated that a function of VGR4154 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4154 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4154 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4154 gene: VGAM625 host target protein, VGAM628 host target protein and VGAM3804 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM625, VGAM628 and VGAM3804

[57855] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4155(VGR4155) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57856] VGR4155 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4155 gene was detected is described hereinabove with reference to Figs. 6-15.

[57857] VGR4155 gene encodes VGR4155 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57858] VGR4155 precursor RNA folds spatially, forming VGR4155 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4155 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4155 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57859] VGR4155 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1806 precursor RNA and VGAM3266 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57860] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1806 RNA and VGAM3266 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57861] VGAM1806 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1806 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1806 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1806 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57862] VGAM3266 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3266 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3266 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3266 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57863] It is appreciated that a function of VGR4155 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4155 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4155 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4155 gene: VGAM1806 host target protein and VGAM3266 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1806 and VGAM3266

[57864] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4156(VGR4156) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57865] VGR4156 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4156 gene was detected is described hereinabove with reference to Figs. 6–15.

[57866] VGR4156 gene encodes VGR4156 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57867] VGR4156 precursor RNA folds spatially, forming VGR4156 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4156 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4156 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57868] VGR4156 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1144 precursor RNA, VGAM1145 precursor RNA, VGAM1146 precursor RNA, VGAM1147 precursor RNA, VGAM1209 precursor RNA and VGAM1213 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57869] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1144 RNA, VGAM1145 RNA, VGAM1146 RNA, VGAM1147 RNA, VGAM1209 RNA and VGAM1213 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to

VGAM RNA of Fig. 8.

[57870] VGAM1144 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1144 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1144 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1144 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57871] VGAM1145 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1145 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1145 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1145 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57872] VGAM1146 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1146 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1146 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1146 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57873] VGAM1147 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1147 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1147 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM1147 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57874] VGAM1209 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1209 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1209 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1209 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57875] VGAM1213 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1213 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1213 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1213 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57876] It is appreciated that a function of VGR4156 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4156 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4156 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4156 gene: VGAM1144 host target protein, VGAM1145 host target protein, VGAM1146 host target protein, VGAM1147 host target protein, VGAM1209 host target protein and VGAM1213 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1144, VGAM1145, VGAM1146, VGAM1147, VGAM1209 and VGAM1213

[57877] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4157(VGR4157) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57878] VGR4157 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4157 gene was detected is described hereinabove with reference to Figs. 6–15.

[57879] VGR4157 gene encodes VGR4157 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57880] VGR4157 precursor RNA folds spatially, forming VGR4157 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4157 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4157 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57881] VGR4157 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3075 precursor RNA, VGAM3076 precursor RNA and VGAM3219 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57882] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3075 RNA, VGAM3076 RNA and VGAM3219 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57883] VGAM3075 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM3075 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3075 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3075 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57884] VGAM3076 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3076 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3076 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3076 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57885] VGAM3219 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3219 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3219 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3219 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57886] It is appreciated that a function of VGR4157 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4157 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4157 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4157 gene: VGAM3075 host target protein, VGAM3076 host target protein and VGAM3219 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3075, VGAM3076 and VGAM3219

[57887] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4158(VGR4158) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57888] VGR4158 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4158 gene was detected is described hereinabove with reference to Figs. 6–15.

[57889] VGR4158 gene encodes VGR4158 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57890] VGR4158 precursor RNA folds spatially, forming VGR4158 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4158 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4158 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57891] VGR4158 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2696 precursor RNA, VGAM3007 precursor RNA, VGAM3342 precursor RNA and VGAM3404 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57892] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2696 RNA, VGAM3007 RNA, VGAM3342 RNA and VGAM3404

RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57893] VGAM2696 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2696 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2696 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2696 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57894] VGAM3007 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3007 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3007 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3007 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57895] VGAM3342 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3342 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3342 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3342 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57896] VGAM3404 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3404 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3404 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3404 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57897] It is appreciated that a function of VGR4158 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4158 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4158 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4158 gene: VGAM2696 host target protein, VGAM3007 host target protein, VGAM3342 host target protein and VGAM3404 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2696, VGAM3007, VGAM3342 and VGAM3404

[57898] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4159(VGR4159) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57899] VGR4159 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4159 gene was detected is described hereinabove with reference to Figs. 6–15.

[57900] VGR4159 gene encodes VGR4159 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57901] VGR4159 precursor RNA folds spatially, forming VGR4159 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4159 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4159 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57902] VGR4159 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3466 precursor RNA, VGAM3467 precursor RNA and VGAM3542 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57903] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3466 RNA, VGAM3467 RNA and VGAM3542 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57904] VGAM3466 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM3466 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3466 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3466 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57905] VGAM3467 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3467 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3467 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3467 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57906] VGAM3542 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3542 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3542 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3542 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57907] It is appreciated that a function of VGR4159 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4159 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4159 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4159 gene: VGAM3466 host target protein, VGAM3467 host target protein and VGAM3542 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3466, VGAM3467 and VGAM3542

[57908] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4160(VGR4160) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57909] VGR4160 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4160 gene was detected is described hereinabove with reference to Figs. 6–15.

[57910] VGR4160 gene encodes VGR4160 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57911] VGR4160 precursor RNA folds spatially, forming VGR4160 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4160 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4160 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57912] VGR4160 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2807 precursor RNA, VGAM2871 precursor RNA and VGAM3399 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57913] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2807 RNA, VGAM2871 RNA and VGAM3399 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2

RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57914] VGAM2807 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2807 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2807 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2807 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57915] VGAM2871 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2871 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2871 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM2871 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57916] VGAM3399 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3399 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3399 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3399 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57917] It is appreciated that a function of VGR4160 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4160 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4160 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4160 gene: VGAM2807 host target protein, VGAM2871 host target protein and VGAM3399 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2807, VGAM2871 and VGAM3399

[57918] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4161(VGR4161) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57919] VGR4161 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4161 gene was detected is described hereinabove with reference to Figs. 6–15.

[57920] VGR4161 gene encodes VGR4161 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[57921] VGR4161 precursor RNA folds spatially, forming VGR4161 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4161 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4161 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57922] VGR4161 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1111 precursor RNA and VGAM1113 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57923] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1111 RNA and VGAM1113 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57924] VGAM1111 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1111 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1111 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1111 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57925] VGAM1113 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1113 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1113 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1113 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57926] It is appreciated that a function of VGR4161 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4161 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4161 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4161 gene: VGAM1111 host target protein and VGAM1113 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1111 and VGAM1113

[57927] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4162(VGR4162) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57928] VGR4162 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4162 gene was detected is described hereinabove with reference to Figs. 6–15.

[57929] VGR4162 gene encodes VGR4162 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57930] VGR4162 precursor RNA folds spatially, forming VGR4162 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4162 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4162 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57931] VGR4162 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1035 precursor RNA, VGAM1038 precursor RNA and VGAM1101 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57932] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1035 RNA, VGAM1038 RNA and VGAM1101 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57933] VGAM1035 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1035 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1035 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1035 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57934] VGAM1038 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1038 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1038 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1038 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57935] VGAM1101 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1101 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1101 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1101 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57936] It is appreciated that a function of VGR4162 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4162 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4162 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4162 gene: VGAM1035 host target protein, VGAM1038 host target protein and VGAM1101 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1035, VGAM1038 and VGAM1101

[57937] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4163(VGR4163) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57938] VGR4163 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4163 gene was detected is described hereinabove with reference to Figs. 6–15.

[57939] VGR4163 gene encodes VGR4163 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57940] VGR4163 precursor RNA folds spatially, forming VGR4163 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4163 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4163 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57941] VGR4163 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1186 precursor RNA, VGAM1189 precursor RNA, VGAM1190 precursor RNA, VGAM2122 precursor RNA, VGAM2923 precursor RNA and VGAM3353 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57942] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1186 RNA, VGAM1189 RNA, VGAM1190 RNA, VGAM2122 RNA, VGAM2923 RNA and VGAM3353 RNA respectively, herein

schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57943] VGAM1186 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1186 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1186 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1186 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57944] VGAM1189 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1189 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1189 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1189 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57945] VGAM1190 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1190 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1190 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1190 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57946] VGAM2122 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2122 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2122 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2122 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57947] VGAM2923 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2923 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2923 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2923 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57948] VGAM3353 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3353 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3353 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3353 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57949] It is appreciated that a function of VGR4163 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4163 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4163 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4163 gene: VGAM1186 host target protein, VGAM1189 host target protein, VGAM1190 host target protein, VGAM2122 host target protein, VGAM2923 host target protein and VGAM3353 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host tar-

get genes is elaborated hereinabove with reference to VGAM1186, VGAM1189, VGAM1190, VGAM2122, VGAM2923 and VGAM3353

[57950] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4164(VGR4164) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57951] VGR4164 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4164 gene was detected is described hereinabove with reference to Figs. 6–15.

[57952] VGR4164 gene encodes VGR4164 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57953] VGR4164 precursor RNA folds spatially, forming VGR4164 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4164 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4164 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57954] VGR4164 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1794 precursor RNA, VGAM1795 precursor RNA, VGAM1797 precursor RNA, VGAM2166 precursor RNA, VGAM2167 precursor RNA and VGAM2882 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57955] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1794 RNA, VGAM1795 RNA, VGAM1797 RNA, VGAM2166 RNA,

VGAM2167 RNA and VGAM2882 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57956] VGAM1794 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1794 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1794 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1794 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57957] VGAM1795 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1795 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1795 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1795 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57958] VGAM1797 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1797 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1797 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1797 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57959] VGAM2166 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2166 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2166 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2166 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57960] VGAM2167 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2167 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2167 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2167 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57961] VGAM2882 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2882 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2882 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2882 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57962] It is appreciated that a function of VGR4164 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4164 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4164 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4164 gene: VGAM1794 host target protein, VGAM1795 host target protein, VGAM1797 host target protein, VGAM2166 host target protein, VGAM2167 host target protein and VGAM2882 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1794, VGAM1795, VGAM1797, VGAM2166, VGAM2167 and VGAM2882

[57963] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4165(VGR4165) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57964] VGR4165 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4165 gene was detected is described hereinabove with reference to Figs. 6–15.

[57965] VGR4165 gene encodes VGR4165 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57966] VGR4165 precursor RNA folds spatially, forming VGR4165 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4165 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4165 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57967] VGR4165 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1844 precursor RNA, VGAM1849 precursor RNA, VGAM1850 precursor RNA, VGAM1978 precursor RNA, VGAM2896 precursor RNA and VGAM3263 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57968] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1844

RNA, VGAM1849 RNA, VGAM1850 RNA, VGAM1978 RNA, VGAM2896 RNA and VGAM3263 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57969] VGAM1844 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1844 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1844 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1844 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57970] VGAM1849 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1849 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1849 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1849 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57971] VGAM1850 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1850 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1850 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1850 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57972] VGAM1978 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1978 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1978 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1978 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57973] VGAM2896 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2896 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2896 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2896 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[57974] VGAM3263 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3263 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3263 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3263 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[57975] It is appreciated that a function of VGR4165 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4165 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4165 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4165 gene: VGAM1844 host target protein, VGAM1849 host target protein, VGAM1850 host target protein, VGAM1978 host target protein, VGAM2896 host target protein and VGAM3263 host target protein, herein schematically represented by

VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1844, VGAM1849, VGAM1850, VGAM1978, VGAM2896 and VGAM3263

[57976] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4166(VGR4166) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57977] VGR4166 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4166 gene was detected is described hereinabove with reference to Figs. 6-15.

[57978] VGR4166 gene encodes VGR4166 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57979] VGR4166 precursor RNA folds spatially, forming VGR4166 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4166 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4166 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57980] VGR4166 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1151 precursor RNA, VGAM1152 precursor RNA, VGAM1153 precursor RNA and VGAM1154 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57981] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1151

RNA, VGAM1152 RNA, VGAM1153 RNA and VGAM1154 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57982] VGAM1151 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1151 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1151 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1151 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57983] VGAM1152 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1152 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1152 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1152 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57984] VGAM1153 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1153 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1153 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1153 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[57985] VGAM1154 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1154 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1154 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1154 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[57986] It is appreciated that a function of VGR4166 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4166 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4166 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4166 gene: VGAM1151 host target protein, VGAM1152 host target protein, VGAM1153 host target protein and VGAM1154 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1151,

VGAM1152, VGAM1153 and VGAM1154

[57987] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4167(VGR4167) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57988] VGR4167 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4167 gene was detected is described hereinabove with reference to Figs. 6–15.

[57989] VGR4167 gene encodes VGR4167 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57990] VGR4167 precursor RNA folds spatially, forming VGR4167 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4167 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4167 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[57991] VGR4167 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2684 precursor RNA and VGAM3388 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[57992] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2684 RNA and VGAM3388 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[57993] VGAM2684 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2684 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2684 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2684 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[57994] VGAM3388 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3388 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3388 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3388 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[57995] It is appreciated that a function of VGR4167 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4167 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4167 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4167 gene: VGAM2684 host target protein and VGAM3388 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2684 and VGAM3388

[57996] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4168(VGR4168) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[57997] VGR4168 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4168 gene was detected is described hereinabove with reference to Figs. 6–15.

[57998] VGR4168 gene encodes VGR4168 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[57999] VGR4168 precursor RNA folds spatially, forming VGR4168 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4168 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4168 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58000] VGR4168 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1103 precursor RNA, VGAM1105 precursor RNA and VGAM1106 precursor RNA, herein

schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58001] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1103 RNA, VGAM1105 RNA and VGAM1106 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58002] VGAM1103 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1103 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1103 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1103 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58003] VGAM1105 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1105 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1105 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1105 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58004] VGAM1106 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1106 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1106 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1106 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58005] It is appreciated that a function of VGR4168 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4168 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4168 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4168 gene: VGAM1103 host target protein, VGAM1105 host target protein and VGAM1106 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1103, VGAM1105 and VGAM1106

[58006] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4169(VGR4169) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58007] VGR4169 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4169 gene was detected is described hereinabove with reference to Figs. 6–15.

[58008] VGR4169 gene encodes VGR4169 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58009] VGR4169 precursor RNA folds spatially, forming VGR4169 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4169 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4169 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58010] VGR4169 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1166 precursor RNA, VGAM1167 precursor RNA, VGAM1168 precursor RNA, VGAM3159 precursor RNA, VGAM3250 precursor RNA, VGAM3325 precursor RNA and VGAM3326 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58011] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1166 RNA, VGAM1167 RNA, VGAM1168 RNA, VGAM3159 RNA, VGAM3250 RNA, VGAM3325 RNA and VGAM3326 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58012] VGAM1166 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM1166 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1166 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1166 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58013] VGAM1167 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1167 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1167 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1167 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58014] VGAM1168 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1168 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1168 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1168 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58015] VGAM3159 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3159 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3159 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3159 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58016] VGAM3250 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3250 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3250 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3250 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58017] VGAM3325 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3325 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3325 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3325 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[58018] VGAM3326 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3326 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3326 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3326 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58019] It is appreciated that a function of VGR4169 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4169 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4169 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4169 gene: VGAM1166

host target protein, VGAM1167 host target protein, VGAM1168 host target protein, VGAM3159 host target protein, VGAM3250 host target protein, VGAM3325 host target protein and VGAM3326 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1166, VGAM1167, VGAM1168, VGAM3159, VGAM3250, VGAM3325 and VGAM3326

[58020] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4170(VGR4170) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58021] VGR4170 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4170 gene was detected is described hereinabove with reference to Figs. 6-15.

[58022] VGR4170 gene encodes VGR4170 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58023] VGR4170 precursor RNA folds spatially, forming VGR4170 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4170 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4170 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58024] VGR4170 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2909 precursor RNA, VGAM2910 precursor RNA, VGAM3267 precursor RNA, VGAM3345 precursor RNA and VGAM3346 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM

precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58025] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2909 RNA, VGAM2910 RNA, VGAM3267 RNA, VGAM3345 RNA and VGAM3346 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58026] VGAM2909 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2909 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2909 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2909 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58027] VGAM2910 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2910 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2910 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2910 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58028] VGAM3267 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3267 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3267 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3267 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58029] VGAM3345 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3345 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3345 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3345 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58030] VGAM3346 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3346 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3346 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3346 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[58031] It is appreciated that a function of VGR4170 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4170 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4170 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4170 gene: VGAM2909 host target protein, VGAM2910 host target protein, VGAM3267 host target protein, VGAM3345 host target protein and VGAM3346 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2909, VGAM2910, VGAM3267, VGAM3345 and VGAM3346

[58032] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4171(VGR4171) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58033] VGR4171 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4171 gene was detected is described hereinabove with reference to Figs. 6–15.

[58034] VGR4171 gene encodes VGR4171 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58035] VGR4171 precursor RNA folds spatially, forming VGR4171 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4171 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4171 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58036] VGR4171 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2738 precursor RNA, VGAM2830 precursor RNA, VGAM3264 precursor RNA and VGAM3265 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58037] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2738 RNA, VGAM2830 RNA, VGAM3264 RNA and VGAM3265 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58038] VGAM2738 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2738 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2738 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2738 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58039] VGAM2830 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2830 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2830 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2830 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58040] VGAM3264 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3264 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3264 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3264 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58041] VGAM3265 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3265 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3265 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3265 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58042] It is appreciated that a function of VGR4171 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4171 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4171 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4171 gene: VGAM2738 host target protein, VGAM2830 host target protein, VGAM3264 host target protein and VGAM3265 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2738, VGAM2830, VGAM3264 and VGAM3265

[58043] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4172(VGR4172) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58044] VGR4172 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4172 gene was detected is described hereinabove with reference to Figs. 6–15.

[58045] VGR4172 gene encodes VGR4172 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58046] VGR4172 precursor RNA folds spatially, forming VGR4172 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4172 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4172 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58047] VGR4172 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2805 precursor RNA and VGAM3270

precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58048] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2805 RNA and VGAM3270 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58049] VGAM2805 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2805 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2805 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2805 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58050] VGAM3270 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3270 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3270 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3270 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58051] It is appreciated that a function of VGR4172 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4172 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4172 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4172 gene: VGAM2805

host target protein and VGAM3270 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2805 and VGAM3270

[58052] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4173(VGR4173) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58053] VGR4173 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4173 gene was detected is described hereinabove with reference to Figs. 6–15.

[58054] VGR4173 gene encodes VGR4173 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58055] VGR4173 precursor RNA folds spatially, forming VGR4173 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4173 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4173 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58056] VGR4173 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1231 precursor RNA, VGAM1233 precursor RNA and VGAM2206 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58057] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1231 RNA, VGAM1233 RNA and VGAM2206 RNA respectively,

herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58058] VGAM1231 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1231 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1231 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1231 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58059] VGAM1233 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1233 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1233 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM1233 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58060] VGAM2206 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2206 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2206 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2206 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58061] It is appreciated that a function of VGR4173 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4173 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4173 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4173 gene: VGAM1231 host target protein, VGAM1233 host target protein and VGAM2206 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1231, VGAM1233 and VGAM2206

[58062] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4174(VGR4174) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58063] VGR4174 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4174 gene was detected is described hereinabove with reference to Figs. 6-15.

[58064] VGR4174 gene encodes VGR4174 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58065] VGR4174 precursor RNA folds spatially, forming VGR4174 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4174 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4174 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58066] VGR4174 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM806 precursor RNA, VGAM2050 precursor RNA and VGAM2051 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58067] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM806 RNA, VGAM2050 RNA and VGAM2051 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58068] VGAM806 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM806 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM806 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM806 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58069] VGAM2050 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2050 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2050 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2050 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58070] VGAM2051 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2051 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2051 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2051 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58071] It is appreciated that a function of VGR4174 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4174 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4174 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4174 gene: VGAM806 host target protein, VGAM2050 host target protein and VGAM2051 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM806, VGAM2050 and VGAM2051

[58072] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4175(VGR4175) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58073] VGR4175 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4175 gene was detected is described hereinabove with reference to Figs. 6–15.

[58074] VGR4175 gene encodes VGR4175 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58075] VGR4175 precursor RNA folds spatially, forming VGR4175 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4175 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4175 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58076] VGR4175 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1081 precursor RNA, VGAM2585 precursor RNA, VGAM2586 precursor RNA and VGAM3369 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58077] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1081 RNA, VGAM2585 RNA, VGAM2586 RNA and VGAM3369 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58078] VGAM1081 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1081 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1081 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1081 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58079] VGAM2585 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2585 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2585 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2585 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58080] VGAM2586 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2586 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2586 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM2586 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58081] VGAM3369 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3369 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3369 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3369 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58082] It is appreciated that a function of VGR4175 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4175 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4175 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4175 gene: VGAM1081 host target protein, VGAM2585 host target protein, VGAM2586 host target protein and VGAM3369 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1081, VGAM2585, VGAM2586 and VGAM3369

[58083] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4176(VGR4176) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58084] VGR4176 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4176 gene was detected is described hereinabove with reference to Figs. 6-15.

[58085] VGR4176 gene encodes VGR4176 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58086] VGR4176 precursor RNA folds spatially, forming VGR4176 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4176 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4176 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58087] VGR4176 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM976 precursor RNA, VGAM1042 precursor RNA, VGAM1043 precursor RNA and VGAM2683 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig.

8.

[58088] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM976 RNA, VGAM1042 RNA, VGAM1043 RNA and VGAM2683 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58089] VGAM976 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM976 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM976 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM976 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58090] VGAM1042 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM1042 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1042 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1042 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58091] VGAM1043 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1043 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1043 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1043 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58092] VGAM2683 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2683 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2683 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2683 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58093] It is appreciated that a function of VGR4176 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4176 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4176 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4176 gene: VGAM976 host target protein, VGAM1042 host target protein, VGAM1043 host target protein and VGAM2683 host target protein,

herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM976, VGAM1042, VGAM1043 and VGAM2683

[58094] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4177(VGR4177) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58095] VGR4177 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4177 gene was detected is described hereinabove with reference to Figs. 6-15.

[58096] VGR4177 gene encodes VGR4177 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58097] VGR4177 precursor RNA folds spatially, forming VGR4177 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4177 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4177 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58098] VGR4177 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1116 precursor RNA, VGAM1119 precursor RNA, VGAM1639 precursor RNA, VGAM1645 precursor RNA and VGAM3291 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58099] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1116

RNA, VGAM1119 RNA, VGAM1639 RNA, VGAM1645 RNA and VGAM3291 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58100] VGAM1116 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1116 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1116 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1116 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58101] VGAM1119 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1119 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1119 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1119 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58102] VGAM1639 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1639 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1639 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1639 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58103] VGAM1645 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1645 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1645 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1645 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[58104] VGAM3291 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3291 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3291 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3291 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58105] It is appreciated that a function of VGR4177 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4177 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4177 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4177 gene: VGAM1116

host target protein, VGAM1119 host target protein, VGAM1639 host target protein, VGAM1645 host target protein and VGAM3291 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1116, VGAM1119, VGAM1639, VGAM1645 and VGAM3291

[58106] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4178(VGR4178) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58107] VGR4178 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4178 gene was detected is described hereinabove with reference to Figs. 6–15.

[58108] VGR4178 gene encodes VGR4178 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[58109] VGR4178 precursor RNA folds spatially, forming VGR4178 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4178 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4178 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58110] VGR4178 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1946 precursor RNA and VGAM3317 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58111] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1946 RNA and VGAM3317 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58112] VGAM1946 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1946 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1946 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1946 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58113] VGAM3317 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3317 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3317 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3317 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [58114] It is appreciated that a function of VGR4178 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4178 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4178 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4178 gene: VGAM1946 host target protein and VGAM3317 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1946 and VGAM3317
- [58115] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4179(VGR4179) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58116] VGR4179 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4179 gene was detected is described hereinabove with reference to Figs. 6–15.

[58117] VGR4179 gene encodes VGR4179 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58118] VGR4179 precursor RNA folds spatially, forming VGR4179 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4179 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4179 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58119] VGR4179 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1063 precursor RNA, VGAM1064 precursor RNA, VGAM1065 precursor RNA, VGAM1434 precursor RNA, VGAM1435 precursor RNA, VGAM1437 precursor RNA and VGAM3290 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58120] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1063 RNA, VGAM1064 RNA, VGAM1065 RNA, VGAM1434 RNA, VGAM1435 RNA, VGAM1437 RNA and VGAM3290 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of

which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58121] VGAM1063 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1063 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1063 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1063 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58122] VGAM1064 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1064 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1064 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1064 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58123] VGAM1065 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1065 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1065 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1065 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58124] VGAM1434 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1434 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1434 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM1434 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58125] VGAM1435 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1435 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1435 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1435 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58126] VGAM1437 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1437 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1437 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1437 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58127] VGAM3290 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3290 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3290 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3290 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58128] It is appreciated that a function of VGR4179 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4179 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4179 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4179 gene: VGAM1063 host target protein, VGAM1064 host target protein, VGAM1065 host target protein, VGAM1434 host target protein, VGAM1435 host target protein, VGAM1437 host target protein and VGAM3290 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1063, VGAM1064, VGAM1065, VGAM1434, VGAM1435, VGAM1437 and VGAM3290

[58129] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4180(VGR4180) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58130] VGR4180 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4180 gene was detected is described hereinabove with reference to Figs. 6–15.

[58131] VGR4180 gene encodes VGR4180 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58132] VGR4180 precursor RNA folds spatially, forming VGR4180 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4180 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4180 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58133] VGR4180 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1193 precursor RNA, VGAM1194 precursor RNA, VGAM3282 precursor RNA and VGAM3543 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58134] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1193 RNA, VGAM1194 RNA, VGAM3282 RNA and VGAM3543 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58135] VGAM1193 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1193 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1193 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1193 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58136] VGAM1194 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1194 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1194 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1194 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58137] VGAM3282 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3282 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3282 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM3282 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58138] VGAM3543 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3543 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3543 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3543 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58139] It is appreciated that a function of VGR4180 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4180 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4180 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4180 gene: VGAM1193 host target protein, VGAM1194 host target protein, VGAM3282 host target protein and VGAM3543 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1193, VGAM1194, VGAM3282 and VGAM3543

[58140] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4181(VGR4181) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58141] VGR4181 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4181 gene was detected is described hereinabove with reference to Figs. 6-15.

[58142] VGR4181 gene encodes VGR4181 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58143] VGR4181 precursor RNA folds spatially, forming VGR4181 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4181 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4181 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58144] VGR4181 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM746 precursor RNA, VGAM753 precursor RNA, VGAM755 precursor RNA and VGAM3249 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58145] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM746 RNA, VGAM753 RNA, VGAM755 RNA and VGAM3249 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58146] VGAM746 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM746 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM746 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM746 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58147] VGAM753 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM753 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM753 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM753 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58148] VGAM755 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM755 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM755 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM755 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58149] VGAM3249 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM3249 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3249 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3249 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58150] It is appreciated that a function of VGR4181 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4181 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4181 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4181 gene: VGAM746 host target protein, VGAM753 host target protein, VGAM755 host target protein and VGAM3249 host target protein, herein schematically represented by VGAM1 HOST TARGET

PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM746, VGAM753, VGAM755 and VGAM3249

[58151] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4182(VGR4182) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58152] VGR4182 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4182 gene was detected is described hereinabove with reference to Figs. 6–15.

[58153] VGR4182 gene encodes VGR4182 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58154] VGR4182 precursor RNA folds spatially, forming VGR4182 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4182 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4182 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58155] VGR4182 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3323 precursor RNA and VGAM3324 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58156] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3323 RNA and VGAM3324 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM

RNA of Fig. 8.

[58157] VGAM3323 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3323 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3323 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3323 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58158] VGAM3324 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3324 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3324 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3324 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58159] It is appreciated that a function of VGR4182 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4182 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4182 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4182 gene: VGAM3323 host target protein and VGAM3324 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3323 and VGAM3324

[58160] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4183(VGR4183) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[58161] VGR4183 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4183 gene was detected is described hereinabove with reference to Figs. 6–15.

[58162] VGR4183 gene encodes VGR4183 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58163] VGR4183 precursor RNA folds spatially, forming VGR4183 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4183 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4183 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58164] VGR4183 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3449 precursor RNA and VGAM3571 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58165] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3449 RNA and VGAM3571 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58166] VGAM3449 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3449 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3449 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM3449 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58167] VGAM3571 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3571 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3571 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3571 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58168] It is appreciated that a function of VGR4183 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4183 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4183 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4183 gene: VGAM3449 host target protein and VGAM3571 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM3449 and VGAM3571

[58169] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4184(VGR4184) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58170] VGR4184 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4184 gene was detected is described hereinabove with reference to Figs. 6-15.

[58171] VGR4184 gene encodes VGR4184 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58172] VGR4184 precursor RNA folds spatially, forming VGR4184 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4184 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4184 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58173] VGR4184 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1578 precursor RNA and VGAM1581 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58174] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1578

RNA and VGAM1581 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58175] VGAM1578 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1578 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1578 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1578 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58176] VGAM1581 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1581 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1581 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1581 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [58177] It is appreciated that a function of VGR4184 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4184 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4184 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4184 gene: VGAM1578 host target protein and VGAM1581 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1578 and VGAM1581
- [58178] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4185(VGR4185) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58179] VGR4185 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4185 gene was detected is described hereinabove with reference to Figs. 6–15.

[58180] VGR4185 gene encodes VGR4185 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58181] VGR4185 precursor RNA folds spatially, forming VGR4185 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4185 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4185 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[58182] VGR4185 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1947 precursor RNA, VGAM2128 precursor RNA, VGAM2129 precursor RNA and VGAM2130 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58183] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1947 RNA, VGAM2128 RNA, VGAM2129 RNA and VGAM2130 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58184] VGAM1947 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1947 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1947 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1947 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58185] VGAM2128 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2128 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2128 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2128 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58186] VGAM2129 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM2129 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2129 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2129 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58187] VGAM2130 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2130 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2130 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2130 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58188] It is appreciated that a function of VGR4185 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4185 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4185 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4185 gene: VGAM1947 host target protein, VGAM2128 host target protein, VGAM2129 host target protein and VGAM2130 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1947, VGAM2128, VGAM2129 and VGAM2130

[58189] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4186(VGR4186) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[58190] VGR4186 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4186 gene was detected is described hereinabove with reference to Figs. 6–15.

[58191] VGR4186 gene encodes VGR4186 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58192] VGR4186 precursor RNA folds spatially, forming VGR4186 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4186 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4186 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58193] VGR4186 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM581 precursor RNA, VGAM588 precursor RNA, VGAM707 precursor RNA, VGAM708 precursor RNA, VGAM711 precursor RNA, VGAM713 precursor RNA, VGAM975 precursor RNA and VGAM1215 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58194] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM581 RNA, VGAM588 RNA, VGAM707 RNA, VGAM708 RNA, VGAM711 RNA, VGAM713 RNA, VGAM975 RNA and VGAM1215 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58195] VGAM581 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM581 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM581 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM581 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58196] VGAM588 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM588 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM588 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM588 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58197] VGAM707 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM707 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM707 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM707 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58198] VGAM708 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM708 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM708 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM708 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58199] VGAM711 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM711 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM711 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM711 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58200] VGAM713 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM713 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM713 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM713 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[58201] VGAM975 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM975 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM975 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM975 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58202] VGAM1215 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1215 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1215 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1215 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58203] It is appreciated that a function of VGR4186 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4186 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4186 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4186 gene: VGAM581 host target protein, VGAM588 host target protein, VGAM707 host target protein, VGAM708 host target protein, VGAM711 host target protein, VGAM713 host target protein, VGAM975 host target protein and VGAM1215 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM581, VGAM588, VGAM707, VGAM708, VGAM711, VGAM713, VGAM975 and VGAM1215

[58204] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4187(VGR4187) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58205] VGR4187 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4187 gene was detected is described hereinabove with reference to Figs. 6–15.

[58206] VGR4187 gene encodes VGR4187 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58207] VGR4187 precursor RNA folds spatially, forming VGR4187 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4187 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4187 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58208] VGR4187 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1217 precursor RNA, VGAM1219 precursor RNA, VGAM1220 precursor RNA, VGAM1221 precursor RNA, VGAM1222 precursor RNA, VGAM1599 precursor RNA, VGAM1608 precursor RNA and VGAM1921 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58209] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1217 RNA, VGAM1219 RNA, VGAM1220 RNA, VGAM1221 RNA, VGAM1222 RNA, VGAM1599 RNA, VGAM1608 RNA and VGAM1921 RNA respectively, herein schematically repre-

sented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58210] VGAM1217 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1217 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1217 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1217 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58211] VGAM1219 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1219 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1219 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1219 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58212] VGAM1220 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1220 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1220 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1220 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58213] VGAM1221 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1221 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1221 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1221 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58214] VGAM1222 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1222 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1222 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1222 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58215] VGAM1599 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1599 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1599 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1599 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58216] VGAM1608 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1608 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1608 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1608 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58217] VGAM1921 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1921 host target RNA, herein schematically represented by VGAM8

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1921 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1921 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58218] It is appreciated that a function of VGR4187 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4187 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4187 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4187 gene: VGAM1217 host target protein, VGAM1219 host target protein, VGAM1220 host target protein, VGAM1221 host target protein, VGAM1222 host target protein, VGAM1599 host target protein, VGAM1608 host target protein and VGAM1921 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1217, VGAM1219, VGAM1220, VGAM1221, VGAM1222, VGAM1599, VGAM1608 and VGAM1921

[58219] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4188(VGR4188) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58220] VGR4188 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4188 gene was detected is described hereinabove with reference to Figs. 6–15.

[58221] VGR4188 gene encodes VGR4188 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58222] VGR4188 precursor RNA folds spatially, forming VGR4188

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4188 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4188 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58223] VGR4188 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1922 precursor RNA, VGAM1924 precursor RNA, VGAM2073 precursor RNA, VGAM2329 precursor RNA, VGAM2655 precursor RNA, VGAM2656 precursor RNA, VGAM2733 precursor RNA and VGAM3151 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to

VGAM PRECURSOR RNA of Fig. 8.

[58224] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1922 RNA, VGAM1924 RNA, VGAM2073 RNA, VGAM2329 RNA, VGAM2655 RNA, VGAM2656 RNA, VGAM2733 RNA and VGAM3151 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58225] VGAM1922 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1922 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1922 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1922 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58226] VGAM1924 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1924 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1924 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1924 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58227] VGAM2073 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2073 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2073 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2073 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[58228] VGAM2329 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2329 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2329 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2329 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58229] VGAM2655 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2655 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2655 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2655 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58230] VGAM2656 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2656 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2656 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2656 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58231] VGAM2733 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2733 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2733 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM2733 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58232] VGAM3151 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3151 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3151 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3151 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58233] It is appreciated that a function of VGR4188 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4188 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4188 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4188 gene: VGAM1922 host target protein, VGAM1924 host target protein, VGAM2073 host target protein, VGAM2329 host target protein, VGAM2655 host target protein, VGAM2656 host target protein, VGAM2733 host target protein and VGAM3151 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1922, VGAM1924, VGAM2073, VGAM2329, VGAM2655, VGAM2656, VGAM2733 and VGAM3151

[58234] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4189(VGR4189) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58235] VGR4189 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4189 gene was detected is described hereinabove with reference to Figs. 6–15.

[58236] VGR4189 gene encodes VGR4189 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58237] VGR4189 precursor RNA folds spatially, forming VGR4189 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4189 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4189 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58238] VGR4189 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM3502 precursor RNA, VGAM3521 precursor RNA, VGAM3632 precursor RNA and VGAM3692 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58239] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3502 RNA, VGAM3521 RNA, VGAM3632 RNA and VGAM3692 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58240] VGAM3502 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3502 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3502 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3502 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58241] VGAM3521 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3521 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3521 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3521 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58242] VGAM3632 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3632 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3632 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM3632 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58243] VGAM3692 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3692 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3692 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3692 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58244] It is appreciated that a function of VGR4189 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4189 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4189 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4189 gene: VGAM3502 host target protein, VGAM3521 host target protein, VGAM3632 host target protein and VGAM3692 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3502, VGAM3521, VGAM3632 and VGAM3692

[58245] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4190(VGR4190) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58246] VGR4190 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4190 gene was detected is described hereinabove with reference to Figs. 6-15.

[58247] VGR4190 gene encodes VGR4190 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58248] VGR4190 precursor RNA folds spatially, forming VGR4190 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4190 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4190 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58249] VGR4190 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2883 precursor RNA, VGAM2884 precursor RNA and VGAM3431 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58250] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2883 RNA, VGAM2884 RNA and VGAM3431 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58251] VGAM2883 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2883 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2883 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2883 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58252] VGAM2884 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2884 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2884 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2884 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58253] VGAM3431 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3431 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3431 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3431 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58254] It is appreciated that a function of VGR4190 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4190 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4190 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4190 gene: VGAM2883 host target protein, VGAM2884 host target protein and VGAM3431 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2883, VGAM2884 and VGAM3431

[58255] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4191(VGR4191) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58256] VGR4191 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4191 gene was detected is described hereinabove with reference to Figs. 6–15.

[58257] VGR4191 gene encodes VGR4191 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58258] VGR4191 precursor RNA folds spatially, forming VGR4191 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4191 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4191 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58259] VGR4191 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM3414 precursor RNA, VGAM3415 precursor RNA, VGAM3416 precursor RNA and VGAM3688 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58260] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3414 RNA, VGAM3415 RNA, VGAM3416 RNA and VGAM3688 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58261] VGAM3414 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3414 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3414 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3414 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58262] VGAM3415 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3415 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3415 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3415 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58263] VGAM3416 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3416 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3416 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM3416 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58264] VGAM3688 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3688 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3688 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3688 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58265] It is appreciated that a function of VGR4191 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4191 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4191 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4191 gene: VGAM3414 host target protein, VGAM3415 host target protein, VGAM3416 host target protein and VGAM3688 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3414, VGAM3415, VGAM3416 and VGAM3688

[58266] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4192(VGR4192) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58267] VGR4192 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4192 gene was detected is described hereinabove with reference to Figs. 6-15.

[58268] VGR4192 gene encodes VGR4192 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58269] VGR4192 precursor RNA folds spatially, forming VGR4192 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4192 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4192 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58270] VGR4192 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM736 precursor RNA and VGAM737 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58271] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM736 RNA and VGAM737 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58272] VGAM736 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM736 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM736 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM736 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58273] VGAM737 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM737 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM737 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM737 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58274] It is appreciated that a function of VGR4192 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4192 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4192 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4192 gene: VGAM736 host target protein and VGAM737 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated herein-above with reference to VGAM736 and VGAM737

[58275] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4193(VGR4193) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58276] VGR4193 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4193 gene was detected is described hereinabove with reference to Figs. 6–15.

[58277] VGR4193 gene encodes VGR4193 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58278] VGR4193 precursor RNA folds spatially, forming VGR4193 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4193 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4193 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58279] VGR4193 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1759 precursor RNA, VGAM1760 precursor RNA, VGAM1763 precursor RNA, VGAM1764 precursor RNA and VGAM1765 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58280] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1759 RNA, VGAM1760 RNA, VGAM1763 RNA, VGAM1764 RNA and VGAM1765 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58281] VGAM1759 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1759 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1759 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1759 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58282] VGAM1760 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1760 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1760 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1760 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58283] VGAM1763 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1763 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1763 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1763 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58284] VGAM1764 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1764 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1764 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1764 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[58285] VGAM1765 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1765 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1765 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1765 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58286] It is appreciated that a function of VGR4193 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4193 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4193 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4193 gene: VGAM1759

host target protein, VGAM1760 host target protein, VGAM1763 host target protein, VGAM1764 host target protein and VGAM1765 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1759, VGAM1760, VGAM1763, VGAM1764 and VGAM1765

[58287] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4194(VGR4194) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58288] VGR4194 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4194 gene was detected is described hereinabove with reference to Figs. 6–15.

[58289] VGR4194 gene encodes VGR4194 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[58290] VGR4194 precursor RNA folds spatially, forming VGR4194 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4194 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4194 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58291] VGR4194 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM406 precursor RNA, VGAM407 precursor RNA, VGAM410 precursor RNA, VGAM411 precursor RNA, VGAM602 precursor RNA, VGAM604 precursor RNA, VGAM758 precursor RNA and VGAM759 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively,

each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58292] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM406 RNA, VGAM407 RNA, VGAM410 RNA, VGAM411 RNA, VGAM602 RNA, VGAM604 RNA, VGAM758 RNA and VGAM759 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58293] VGAM406 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM406 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM406 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM406 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58294] VGAM407 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM407 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM407 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM407 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58295] VGAM410 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM410 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM410 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM410 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58296] VGAM411 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM411 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM411 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM411 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58297] VGAM602 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM602 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM602 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM602 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58298] VGAM604 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM604 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM604 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM604 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58299] VGAM758 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM758 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM758 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM758 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58300] VGAM759 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM759 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM759 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM759 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58301] It is appreciated that a function of VGR4194 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4194 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4194

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4194 gene: VGAM406 host target protein, VGAM407 host target protein, VGAM410 host target protein, VGAM411 host target protein, VGAM602 host target protein, VGAM604 host target protein, VGAM758 host target protein and VGAM759 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM406, VGAM407, VGAM410, VGAM411, VGAM602, VGAM604, VGAM758 and VGAM759

[58302] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4195(VGR4195) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58303] VGR4195 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4195 gene was detected is described hereinabove with reference to Figs. 6–15.

[58304] VGR4195 gene encodes VGR4195 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58305] VGR4195 precursor RNA folds spatially, forming VGR4195 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4195 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4195 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58306] VGR4195 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM760 precursor RNA, VGAM761 precursor RNA, VGAM2168 precursor RNA, VGAM2543 precursor

RNA, VGAM2544 precursor RNA, VGAM2545 precursor RNA, VGAM3095 precursor RNA and VGAM3096 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58307] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM760 RNA, VGAM761 RNA, VGAM2168 RNA, VGAM2543 RNA, VGAM2544 RNA, VGAM2545 RNA, VGAM3095 RNA and VGAM3096 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58308] VGAM760 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM760 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM760 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM760 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58309] VGAM761 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM761 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM761 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM761 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58310] VGAM2168 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2168 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2168 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2168 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58311] VGAM2543 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2543 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2543 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2543 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58312] VGAM2544 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM2544 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2544 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2544 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58313] VGAM2545 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2545 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2545 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2545 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58314] VGAM3095 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3095 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3095 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3095 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58315] VGAM3096 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3096 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3096 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3096 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58316] It is appreciated that a function of VGR4195 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4195 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4195 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4195 gene: VGAM760 host target protein, VGAM761 host target protein, VGAM2168 host target protein, VGAM2543 host target protein, VGAM2544 host target protein, VGAM2545 host target protein, VGAM3095 host target protein and VGAM3096 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM760, VGAM761, VGAM2168, VGAM2543, VGAM2544, VGAM2545, VGAM3095 and VGAM3096

[58317] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4196(VGR4196) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58318] VGR4196 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4196 gene was detected is described hereinabove with reference to Figs. 6–15.

[58319] VGR4196 gene encodes VGR4196 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58320] VGR4196 precursor RNA folds spatially, forming VGR4196 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4196 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4196 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[58321] VGR4196 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM3341 precursor RNA, VGAM3394 precursor RNA, VGAM3411 precursor RNA, VGAM3681 precursor RNA, VGAM3682 precursor RNA and VGAM3751 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58322] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3341 RNA, VGAM3394 RNA, VGAM3411 RNA, VGAM3681 RNA, VGAM3682 RNA and VGAM3751 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58323] VGAM3341 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3341 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3341 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3341 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58324] VGAM3394 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3394 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3394 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3394 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58325] VGAM3411 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3411 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3411 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3411 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58326] VGAM3681 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3681 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3681 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3681 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[58327] VGAM3682 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3682 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3682 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3682 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58328] VGAM3751 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3751 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3751 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3751 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58329] It is appreciated that a function of VGR4196 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4196 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4196 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4196 gene: VGAM3341 host target protein, VGAM3394 host target protein, VGAM3411 host target protein, VGAM3681 host target protein, VGAM3682 host target protein and VGAM3751 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3341, VGAM3394, VGAM3411, VGAM3681, VGAM3682 and VGAM3751

[58330] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4197(VGR4197) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58331] VGR4197 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4197 gene was detected is described hereinabove with reference to Figs. 6-15.

[58332] VGR4197 gene encodes VGR4197 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58333] VGR4197 precursor RNA folds spatially, forming VGR4197 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4197 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4197 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58334] VGR4197 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1426 precursor RNA, VGAM1427 precursor RNA and VGAM1431 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58335] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1426 RNA, VGAM1427 RNA and VGAM1431 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58336] VGAM1426 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1426 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1426 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1426 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58337] VGAM1427 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1427 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1427 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1427 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58338] VGAM1431 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1431 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1431 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1431 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58339] It is appreciated that a function of VGR4197 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4197 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4197 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4197 gene: VGAM1426 host target protein, VGAM1427 host target protein and VGAM1431 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1426, VGAM1427 and VGAM1431

[58340] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4198(VGR4198) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58341] VGR4198 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4198 gene was detected is described hereinabove with reference to Figs. 6–15.

[58342] VGR4198 gene encodes VGR4198 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58343] VGR4198 precursor RNA folds spatially, forming VGR4198 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4198 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4198 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58344] VGR4198 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2290 precursor RNA and VGAM2678 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58345] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2290 RNA and VGAM2678 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58346] VGAM2290 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2290 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2290 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2290 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58347] VGAM2678 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2678 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2678 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2678 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58348] It is appreciated that a function of VGR4198 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4198 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4198 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4198 gene: VGAM2290 host target protein and VGAM2678 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2290 and VGAM2678

[58349] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4199(VGR4199) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58350] VGR4199 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4199 gene was detected is described hereinabove with reference to Figs. 6–15.

[58351] VGR4199 gene encodes VGR4199 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58352] VGR4199 precursor RNA folds spatially, forming VGR4199 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4199 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4199 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58353] VGR4199 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2483 precursor RNA and VGAM2484

precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58354] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2483 RNA and VGAM2484 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58355] VGAM2483 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2483 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2483 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2483 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58356] VGAM2484 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2484 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2484 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2484 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58357] It is appreciated that a function of VGR4199 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4199 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4199 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4199 gene: VGAM2483

host target protein and VGAM2484 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2483 and VGAM2484

[58358] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4200(VGR4200) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58359] VGR4200 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4200 gene was detected is described hereinabove with reference to Figs. 6–15.

[58360] VGR4200 gene encodes VGR4200 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58361] VGR4200 precursor RNA folds spatially, forming VGR4200 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4200 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4200 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58362] VGR4200 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1497 precursor RNA and VGAM1499 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58363] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1497 RNA and VGAM1499 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respec-

tively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58364] VGAM1497 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1497 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1497 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1497 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58365] VGAM1499 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1499 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1499 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1499 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58366] It is appreciated that a function of VGR4200 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4200 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4200 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4200 gene: VGAM1497 host target protein and VGAM1499 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1497 and VGAM1499

[58367] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4201(VGR4201) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58368] VGR4201 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4201 gene was detected is described hereinabove with reference to Figs. 6–15.

[58369] VGR4201 gene encodes VGR4201 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58370] VGR4201 precursor RNA folds spatially, forming VGR4201 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4201 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4201 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58371] VGR4201 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM315 precursor RNA, VGAM318 precursor RNA, VGAM326 precursor RNA and VGAM2438 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58372] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM315 RNA, VGAM318 RNA, VGAM326 RNA and VGAM2438 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58373] VGAM315 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM315 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM315 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM315 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58374] VGAM318 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM318 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM318 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM318 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58375] VGAM326 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM326 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM326 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM326 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58376] VGAM2438 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2438 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2438 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2438 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58377] It is appreciated that a function of VGR4201 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4201 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4201 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4201 gene: VGAM315 host target protein, VGAM318 host target protein, VGAM326 host target protein and VGAM2438 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM315, VGAM318, VGAM326 and VGAM2438

[58378] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4202(VGR4202) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58379] VGR4202 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4202 gene was detected is described hereinabove with reference to Figs. 6–15.

[58380] VGR4202 gene encodes VGR4202 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58381] VGR4202 precursor RNA folds spatially, forming VGR4202 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4202 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4202 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58382] VGR4202 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2349 precursor RNA and VGAM3318 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively,

each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58383] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2349 RNA and VGAM3318 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58384] VGAM2349 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2349 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2349 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2349 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58385] VGAM3318 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3318 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3318 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3318 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58386] It is appreciated that a function of VGR4202 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4202 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4202 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4202 gene: VGAM2349 host target protein and VGAM3318 host target protein, herein schematically represented by VGAM1 HOST TARGET

PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2349 and VGAM3318

[58387] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4203(VGR4203) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58388] VGR4203 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4203 gene was detected is described hereinabove with reference to Figs. 6-15.

[58389] VGR4203 gene encodes VGR4203 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58390] VGR4203 precursor RNA folds spatially, forming VGR4203 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4203 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4203 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58391] VGR4203 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2426 precursor RNA and VGAM2427 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58392] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2426 RNA and VGAM2427 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58393] VGAM2426 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2426 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2426 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2426 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58394] VGAM2427 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2427 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2427 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2427 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[58395] It is appreciated that a function of VGR4203 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4203 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4203 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4203 gene: VGAM2426 host target protein and VGAM2427 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2426 and VGAM2427

[58396] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4204(VGR4204) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[58397] VGR4204 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4204 gene was detected is described hereinabove with reference to Figs. 6–15.

[58398] VGR4204 gene encodes VGR4204 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58399] VGR4204 precursor RNA folds spatially, forming VGR4204 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4204 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4204 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58400] VGR4204 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM pre–

cursor RNAs, VGAM1685 precursor RNA and VGAM1689 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58401] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1685 RNA and VGAM1689 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58402] VGAM1685 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1685 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1685 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1685 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58403] VGAM1689 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1689 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1689 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1689 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58404] It is appreciated that a function of VGR4204 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4204 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4204 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4204 gene: VGAM1685 host target protein and VGAM1689 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM1685 and VGAM1689

[58405] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4205(VGR4205) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58406] VGR4205 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4205 gene was detected is described hereinabove with reference to Figs. 6-15.

[58407] VGR4205 gene encodes VGR4205 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58408] VGR4205 precursor RNA folds spatially, forming VGR4205

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4205 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4205 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58409] VGR4205 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1710 precursor RNA, VGAM1713 precursor RNA, VGAM1715 precursor RNA and VGAM1716 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58410] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1710 RNA, VGAM1713 RNA, VGAM1715 RNA and VGAM1716 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58411] VGAM1710 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1710 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1710 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1710 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58412] VGAM1713 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1713 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1713 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1713 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58413] VGAM1715 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1715 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1715 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1715 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58414] VGAM1716 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1716 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1716 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1716 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58415] It is appreciated that a function of VGR4205 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4205 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4205 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4205 gene: VGAM1710 host target protein, VGAM1713 host target protein, VGAM1715 host target protein and VGAM1716 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is

elaborated hereinabove with reference to VGAM1710, VGAM1713, VGAM1715 and VGAM1716

[58416] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4206(VGR4206) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58417] VGR4206 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4206 gene was detected is described hereinabove with reference to Figs. 6–15.

[58418] VGR4206 gene encodes VGR4206 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58419] VGR4206 precursor RNA folds spatially, forming VGR4206 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4206 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4206 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58420] VGR4206 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM531 precursor RNA and VGAM3706 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58421] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM531 RNA and VGAM3706 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58422] VGAM531 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM531 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM531 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM531 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58423] VGAM3706 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3706 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3706 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3706 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58424] It is appreciated that a function of VGR4206 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4206 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4206 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4206 gene: VGAM531 host target protein and VGAM3706 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated herein-above with reference to VGAM531 and VGAM3706

[58425] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4207(VGR4207) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58426] VGR4207 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4207 gene was detected is described hereinabove with reference to Figs. 6–15.

[58427] VGR4207 gene encodes VGR4207 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58428] VGR4207 precursor RNA folds spatially, forming VGR4207 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4207 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4207 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58429] VGR4207 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2645 precursor RNA and VGAM2646

precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58430] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2645 RNA and VGAM2646 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58431] VGAM2645 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2645 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2645 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2645 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58432] VGAM2646 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2646 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2646 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2646 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58433] It is appreciated that a function of VGR4207 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4207 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4207 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4207 gene: VGAM2645

host target protein and VGAM2646 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2645 and VGAM2646

[58434] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4208(VGR4208) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58435] VGR4208 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4208 gene was detected is described hereinabove with reference to Figs. 6–15.

[58436] VGR4208 gene encodes VGR4208 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58437] VGR4208 precursor RNA folds spatially, forming VGR4208 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4208 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4208 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58438] VGR4208 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM977 precursor RNA and VGAM978 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58439] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM977 RNA and VGAM978 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively,

each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58440] VGAM977 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM977 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM977 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM977 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58441] VGAM978 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM978 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM978 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM978 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58442] It is appreciated that a function of VGR4208 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4208 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4208 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4208 gene: VGAM977 host target protein and VGAM978 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM977 and VGAM978

[58443] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4209(VGR4209) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58444] VGR4209 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4209 gene was detected is described hereinabove with reference to Figs. 6–15.

[58445] VGR4209 gene encodes VGR4209 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58446] VGR4209 precursor RNA folds spatially, forming VGR4209 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4209 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4209 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58447] VGR4209 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM258 precursor RNA, VGAM364 precursor RNA, VGAM365 precursor RNA, VGAM366 precursor RNA, VGAM376 precursor RNA, VGAM584 precursor RNA, VGAM644 precursor RNA and VGAM645 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58448] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM258 RNA, VGAM364 RNA, VGAM365 RNA, VGAM366 RNA, VGAM376 RNA, VGAM584 RNA, VGAM644 RNA and VGAM645 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58449] VGAM258 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM258 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM258 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM258 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58450] VGAM364 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM364 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM364 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM364 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[58451] VGAM365 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM365 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM365 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM365 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58452] VGAM366 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM366 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM366 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM366 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58453] VGAM376 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM376 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM376 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM376 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58454] VGAM584 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM584 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM584 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM584 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58455] VGAM644 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM644 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM644 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM644 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58456] VGAM645 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM645 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM645 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM645 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58457] It is appreciated that a function of VGR4209 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4209 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4209 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4209 gene: VGAM258 host target protein, VGAM364 host target protein, VGAM365 host target protein, VGAM366 host target protein, VGAM376 host target protein, VGAM584 host target protein, VGAM644 host target protein and VGAM645 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM258, VGAM364, VGAM365, VGAM366, VGAM376,

VGAM584, VGAM644 and VGAM645

[58458] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4210(VGR4210) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58459] VGR4210 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4210 gene was detected is described hereinabove with reference to Figs. 6–15.

[58460] VGR4210 gene encodes VGR4210 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58461] VGR4210 precursor RNA folds spatially, forming VGR4210 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4210 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4210 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58462] VGR4210 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM646 precursor RNA, VGAM647 precursor RNA, VGAM648 precursor RNA, VGAM1160 precursor RNA, VGAM1161 precursor RNA, VGAM1176 precursor RNA, VGAM1422 precursor RNA and VGAM1731 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58463] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM646 RNA, VGAM647 RNA, VGAM648 RNA, VGAM1160 RNA,

VGAM1161 RNA, VGAM1176 RNA, VGAM1422 RNA and VGAM1731 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58464] VGAM646 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM646 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM646 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM646 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58465] VGAM647 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM647 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM647 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM647 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58466] VGAM648 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM648 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM648 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM648 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58467] VGAM1160 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1160 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1160 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1160 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58468] VGAM1161 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1161 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1161 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1161 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58469] VGAM1176 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1176 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1176 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1176 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58470] VGAM1422 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1422 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1422 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1422 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58471] VGAM1731 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM1731 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1731 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1731 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58472] It is appreciated that a function of VGR4210 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4210 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4210 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4210 gene: VGAM646 host target protein, VGAM647 host target protein, VGAM648 host target protein, VGAM1160 host target protein, VGAM1161 host target protein, VGAM1176 host target

protein, VGAM1422 host target protein and VGAM1731 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM646, VGAM647, VGAM648, VGAM1160, VGAM1161, VGAM1176, VGAM1422 and VGAM1731

[58473] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4211(VGR4211) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58474] VGR4211 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4211 gene was detected is described hereinabove with reference to Figs. 6-15.

[58475] VGR4211 gene encodes VGR4211 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58476] VGR4211 precursor RNA folds spatially, forming VGR4211 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4211 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4211 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58477] VGR4211 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1963 precursor RNA, VGAM2112 precursor RNA, VGAM2113 precursor RNA, VGAM2132 precursor RNA, VGAM2341 precursor RNA, VGAM2528 precursor RNA, VGAM2529 precursor RNA and VGAM2689 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58478] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1963 RNA, VGAM2112 RNA, VGAM2113 RNA, VGAM2132 RNA, VGAM2341 RNA, VGAM2528 RNA, VGAM2529 RNA and VGAM2689 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58479] VGAM1963 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1963 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1963 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1963 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58480] VGAM2112 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2112 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2112 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2112 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58481] VGAM2113 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2113 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2113 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2113 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58482] VGAM2132 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2132 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2132 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2132 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58483] VGAM2341 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2341 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2341 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM2341 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58484] VGAM2528 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2528 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2528 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2528 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58485] VGAM2529 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2529 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2529 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM2529 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58486] VGAM2689 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2689 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2689 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2689 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58487] It is appreciated that a function of VGR4211 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4211 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4211 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4211 gene: VGAM1963 host target protein, VGAM2112 host target protein, VGAM2113 host target protein, VGAM2132 host target protein, VGAM2341 host target protein, VGAM2528 host target protein, VGAM2529 host target protein and VGAM2689 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1963, VGAM2112, VGAM2113, VGAM2132, VGAM2341, VGAM2528, VGAM2529 and VGAM2689

[58488] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4212(VGR4212) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58489] VGR4212 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4212 gene was detected is described hereinabove with reference to Figs. 6–15.

[58490] VGR4212 gene encodes VGR4212 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58491] VGR4212 precursor RNA folds spatially, forming VGR4212 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4212 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4212 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58492] VGR4212 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2811 precursor RNA, VGAM2812 precursor RNA, VGAM2822 precursor RNA, VGAM2960 pre–

cursor RNA, VGAM2970 precursor RNA, VGAM3322 precursor RNA, VGAM3359 precursor RNA and VGAM3360 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58493] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2811 RNA, VGAM2812 RNA, VGAM2822 RNA, VGAM2960 RNA, VGAM2970 RNA, VGAM3322 RNA, VGAM3359 RNA and VGAM3360 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58494] VGAM2811 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2811 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2811 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2811 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58495] VGAM2812 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2812 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2812 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2812 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58496] VGAM2822 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2822 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2822 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2822 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58497] VGAM2960 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2960 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2960 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2960 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58498] VGAM2970 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM2970 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2970 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2970 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58499] VGAM3322 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3322 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3322 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3322 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58500] VGAM3359 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3359 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3359 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3359 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58501] VGAM3360 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3360 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3360 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3360 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58502] It is appreciated that a function of VGR4212 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4212 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4212 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4212 gene: VGAM2811 host target protein, VGAM2812 host target protein, VGAM2822 host target protein, VGAM2960 host target protein, VGAM2970 host target protein, VGAM3322 host target protein, VGAM3359 host target protein and VGAM3360 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2811, VGAM2812, VGAM2822, VGAM2960, VGAM2970, VGAM3322, VGAM3359 and VGAM3360

[58503] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4213(VGR4213) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58504] VGR4213 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4213 gene was detected is described hereinabove with reference to Figs. 6-15.

[58505] VGR4213 gene encodes VGR4213 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58506] VGR4213 precursor RNA folds spatially, forming VGR4213 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4213 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4213 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58507] VGR4213 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM3428 precursor RNA, VGAM3429 precursor RNA, VGAM3516 precursor RNA and VGAM3694 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58508] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3428 RNA, VGAM3429 RNA, VGAM3516 RNA and VGAM3694 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58509] VGAM3428 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM3428 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3428 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3428 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58510] VGAM3429 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3429 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3429 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3429 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58511] VGAM3516 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3516 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3516 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3516 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58512] VGAM3694 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3694 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3694 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3694 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58513] It is appreciated that a function of VGR4213 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4213 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4213 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4213 gene: VGAM3428 host target protein, VGAM3429 host target protein, VGAM3516 host target protein and VGAM3694 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3428, VGAM3429, VGAM3516 and VGAM3694

[58514] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4214(VGR4214) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[58515] VGR4214 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4214 gene was detected is described hereinabove with reference to Figs. 6–15.

[58516] VGR4214 gene encodes VGR4214 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58517] VGR4214 precursor RNA folds spatially, forming VGR4214 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4214 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4214 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58518] VGR4214 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM670 precursor RNA, VGAM672 precursor RNA, VGAM674 precursor RNA, VGAM675 precursor RNA, VGAM885 precursor RNA, VGAM886 precursor RNA, VGAM887 precursor RNA and VGAM912 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58519] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM670 RNA, VGAM672 RNA, VGAM674 RNA, VGAM675 RNA, VGAM885 RNA, VGAM886 RNA, VGAM887 RNA and VGAM912 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58520] VGAM670 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM670 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM670 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM670 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58521] VGAM672 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM672 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM672 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM672 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58522] VGAM674 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM674 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM674 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM674 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58523] VGAM675 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM675 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM675 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM675 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[58524] VGAM885 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM885 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM885 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM885 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58525] VGAM886 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM886 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM886 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM886 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58526] VGAM887 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM887 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM887 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM887 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58527] VGAM912 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM912 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM912 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM912 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58528] It is appreciated that a function of VGR4214 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4214 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4214 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4214 gene: VGAM670 host target protein, VGAM672 host target protein, VGAM674 host target protein, VGAM675 host target protein, VGAM885 host target protein, VGAM886 host target protein, VGAM887 host target protein and VGAM912 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM670, VGAM672, VGAM674, VGAM675, VGAM885, VGAM886, VGAM887 and VGAM912

[58529] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4215(VGR4215) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58530] VGR4215 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4215 gene was detected is described hereinabove with reference to Figs. 6–15.

[58531] VGR4215 gene encodes VGR4215 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58532] VGR4215 precursor RNA folds spatially, forming VGR4215 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4215 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4215 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58533] VGR4215 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1020 precursor RNA, VGAM1021 precursor RNA, VGAM1686 precursor RNA, VGAM1687 precursor RNA, VGAM1692 precursor RNA, VGAM2213 precursor RNA, VGAM2214 precursor RNA and VGAM2553 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58534] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1020 RNA, VGAM1021 RNA, VGAM1686 RNA, VGAM1687 RNA, VGAM1692 RNA, VGAM2213 RNA, VGAM2214 RNA and

VGAM2553 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58535] VGAM1020 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1020 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1020 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1020 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58536] VGAM1021 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1021 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1021 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1021 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58537] VGAM1686 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1686 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1686 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1686 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58538] VGAM1687 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1687 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1687 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1687 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58539] VGAM1692 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1692 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1692 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1692 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58540] VGAM2213 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2213 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2213 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2213 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58541] VGAM2214 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2214 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2214 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2214 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58542] VGAM2553 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2553 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2553 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2553 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58543] It is appreciated that a function of VGR4215 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4215 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4215 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4215 gene: VGAM1020 host target protein, VGAM1021 host target protein, VGAM1686 host target protein, VGAM1687 host target protein, VGAM1692 host target protein, VGAM2213 host target protein, VGAM2214 host target protein and

VGAM2553 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1020, VGAM1021, VGAM1686, VGAM1687, VGAM1692, VGAM2213, VGAM2214 and VGAM2553

[58544] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4216(VGR4216) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58545] VGR4216 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4216 gene was detected is described hereinabove with reference to Figs. 6-15.

[58546] VGR4216 gene encodes VGR4216 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58547] VGR4216 precursor RNA folds spatially, forming VGR4216 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4216 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4216 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58548] VGR4216 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2773 precursor RNA, VGAM3238 precursor RNA, VGAM3299 precursor RNA, VGAM3313 precursor RNA, VGAM3566 precursor RNA, VGAM3635 precursor RNA, VGAM3647 precursor RNA and VGAM3701 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58549] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2773 RNA, VGAM3238 RNA, VGAM3299 RNA, VGAM3313 RNA, VGAM3566 RNA, VGAM3635 RNA, VGAM3647 RNA and VGAM3701 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58550] VGAM2773 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2773 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2773 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2773 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58551] VGAM3238 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3238 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3238 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3238 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58552] VGAM3299 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3299 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3299 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3299 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58553] VGAM3313 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3313 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3313 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3313 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58554] VGAM3566 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3566 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3566 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM3566 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58555] VGAM3635 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3635 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3635 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3635 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58556] VGAM3647 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3647 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3647 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM3647 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58557] VGAM3701 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3701 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3701 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3701 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58558] It is appreciated that a function of VGR4216 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4216 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4216 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4216 gene: VGAM2773 host target protein, VGAM3238 host target protein, VGAM3299 host target protein, VGAM3313 host target protein, VGAM3566 host target protein, VGAM3635 host target protein, VGAM3647 host target protein and VGAM3701 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2773, VGAM3238, VGAM3299, VGAM3313, VGAM3566, VGAM3635, VGAM3647 and VGAM3701

[58559] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4217(VGR4217) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58560] VGR4217 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4217 gene was detected is described hereinabove with reference to Figs. 6–15.

[58561] VGR4217 gene encodes VGR4217 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58562] VGR4217 precursor RNA folds spatially, forming VGR4217 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4217 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4217 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58563] VGR4217 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3702 precursor RNA, VGAM3707 precursor RNA and VGAM3714 precursor RNA, herein

schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58564] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3702 RNA, VGAM3707 RNA and VGAM3714 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58565] VGAM3702 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3702 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3702 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3702 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58566] VGAM3707 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3707 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3707 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3707 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58567] VGAM3714 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3714 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3714 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3714 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58568] It is appreciated that a function of VGR4217 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4217 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4217 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4217 gene: VGAM3702 host target protein, VGAM3707 host target protein and VGAM3714 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3702, VGAM3707 and VGAM3714

[58569] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4218(VGR4218) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58570] VGR4218 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4218 gene was detected is described hereinabove with reference to Figs. 6–15.

[58571] VGR4218 gene encodes VGR4218 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58572] VGR4218 precursor RNA folds spatially, forming VGR4218 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4218 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4218 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58573] VGR4218 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM113 precursor RNA, VGAM120 precursor RNA, VGAM122 precursor RNA, VGAM127 precursor RNA, VGAM136 precursor RNA, VGAM138 precursor RNA, VGAM140 precursor RNA and VGAM145 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58574] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM113 RNA, VGAM120 RNA, VGAM122 RNA, VGAM127 RNA, VGAM136 RNA, VGAM138 RNA, VGAM140 RNA and VGAM145 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58575] VGAM113 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM113 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM113 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM113 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58576] VGAM120 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM120 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM120 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM120 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[58577] VGAM122 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM122 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM122 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM122 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58578] VGAM127 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM127 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM127 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM127 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58579] VGAM136 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM136 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM136 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM136 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58580] VGAM138 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM138 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM138 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM138 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58581] VGAM140 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM140 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM140 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM140 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58582] VGAM145 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM145 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM145 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM145 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58583] It is appreciated that a function of VGR4218 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4218 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4218 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4218 gene: VGAM113 host target protein, VGAM120 host target protein, VGAM122 host target protein, VGAM127 host target protein, VGAM136 host target protein, VGAM138 host target protein, VGAM140 host target protein and VGAM145 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM113, VGAM120, VGAM122, VGAM127, VGAM136,

VGAM138, VGAM140 and VGAM145

[58584] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4219(VGR4219) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58585] VGR4219 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4219 gene was detected is described hereinabove with reference to Figs. 6–15.

[58586] VGR4219 gene encodes VGR4219 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58587] VGR4219 precursor RNA folds spatially, forming VGR4219 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4219 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4219 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58588] VGR4219 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM148 precursor RNA, VGAM151 precursor RNA, VGAM152 precursor RNA, VGAM336 precursor RNA, VGAM338 precursor RNA, VGAM341 precursor RNA, VGAM342 precursor RNA and VGAM343 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58589] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM148 RNA, VGAM151 RNA, VGAM152 RNA, VGAM336 RNA,

VGAM338 RNA, VGAM341 RNA, VGAM342 RNA and VGAM343 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58590] VGAM148 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM148 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM148 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM148 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58591] VGAM151 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM151 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM151 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM151 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58592] VGAM152 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM152 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM152 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM152 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58593] VGAM336 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM336 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM336 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM336 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58594] VGAM338 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM338 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM338 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM338 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58595] VGAM341 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM341 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM341 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM341 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58596] VGAM342 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM342 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM342 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM342 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58597] VGAM343 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM343 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM343 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM343 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58598] It is appreciated that a function of VGR4219 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4219 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4219 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4219 gene: VGAM148 host target protein, VGAM151 host target protein, VGAM152 host target protein, VGAM336 host target protein, VGAM338 host target protein, VGAM341 host target pro-

tein, VGAM342 host target protein and VGAM343 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM148, VGAM151, VGAM152, VGAM336, VGAM338, VGAM341, VGAM342 and VGAM343

[58599] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4220(VGR4220) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58600] VGR4220 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4220 gene was detected is described hereinabove with reference to Figs. 6-15.

[58601] VGR4220 gene encodes VGR4220 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58602] VGR4220 precursor RNA folds spatially, forming VGR4220 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4220 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4220 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58603] VGR4220 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM348 precursor RNA, VGAM350 precursor RNA, VGAM351 precursor RNA, VGAM352 precursor RNA, VGAM499 precursor RNA, VGAM501 precursor RNA, VGAM691 precursor RNA and VGAM692 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58604] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM348 RNA, VGAM350 RNA, VGAM351 RNA, VGAM352 RNA, VGAM499 RNA, VGAM501 RNA, VGAM691 RNA and VGAM692 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58605] VGAM348 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM348 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM348 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM348 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58606] VGAM350 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM350 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM350 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM350 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58607] VGAM351 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM351 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM351 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM351 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58608] VGAM352 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM352 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM352 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM352 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58609] VGAM499 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM499 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM499 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM499 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58610] VGAM501 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM501 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM501 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM501 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58611] VGAM691 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM691 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM691 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM691 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58612] VGAM692 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM692 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM692 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM692 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58613] It is appreciated that a function of VGR4220 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4220 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4220 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4220 gene: VGAM348 host target protein, VGAM350 host target protein, VGAM351 host target protein, VGAM352 host target protein, VGAM499 host target protein, VGAM501 host target protein, VGAM691 host target protein and VGAM692 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM348, VGAM350, VGAM351, VGAM352, VGAM499, VGAM501, VGAM691 and VGAM692

[58614] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4221(VGR4221) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58615] VGR4221 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4221 gene was detected is described hereinabove with reference to Figs. 6–15.

[58616] VGR4221 gene encodes VGR4221 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58617] VGR4221 precursor RNA folds spatially, forming VGR4221 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4221 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4221 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58618] VGR4221 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM693 precursor RNA, VGAM773 precursor RNA, VGAM774 precursor RNA, VGAM775 precursor RNA, VGAM776 precursor RNA, VGAM811 precursor RNA,

VGAM813 precursor RNA and VGAM814 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58619] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM693 RNA, VGAM773 RNA, VGAM774 RNA, VGAM775 RNA, VGAM776 RNA, VGAM811 RNA, VGAM813 RNA and VGAM814 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58620] VGAM693 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM693 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM693 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM693 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58621] VGAM773 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM773 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM773 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM773 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58622] VGAM774 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM774 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM774 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM774 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58623] VGAM775 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM775 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM775 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM775 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58624] VGAM776 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM776 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM776 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM776 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58625] VGAM811 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM811 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM811 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM811 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58626] VGAM813 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM813 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM813 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM813 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58627] VGAM814 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM814 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM814 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM814 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58628] It is appreciated that a function of VGR4221 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4221 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4221 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4221 gene: VGAM693 host target protein, VGAM773 host target protein, VGAM774 host target protein, VGAM775 host target protein, VGAM776 host target protein, VGAM811 host target protein, VGAM813 host target protein and VGAM814 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM693, VGAM773, VGAM774, VGAM775, VGAM776, VGAM811, VGAM813 and VGAM814

[58629] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4222(VGR4222) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58630] VGR4222 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4222 gene was detected is described hereinabove with reference to Figs. 6–15.

[58631] VGR4222 gene encodes VGR4222 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58632] VGR4222 precursor RNA folds spatially, forming VGR4222 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4222 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4222 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58633] VGR4222 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1298 precursor RNA, VGAM1299 precursor RNA, VGAM1300 precursor RNA, VGAM1301 precursor RNA, VGAM1302 precursor RNA, VGAM1303 precursor RNA, VGAM1718 precursor RNA and VGAM1719 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58634] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1298 RNA, VGAM1299 RNA, VGAM1300 RNA, VGAM1301 RNA, VGAM1302 RNA, VGAM1303 RNA, VGAM1718 RNA and VGAM1719 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[58635] VGAM1298 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1298 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1298 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1298 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58636] VGAM1299 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1299 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1299 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1299 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58637] VGAM1300 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1300 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1300 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1300 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58638] VGAM1301 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1301 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1301 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM1301 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58639] VGAM1302 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1302 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1302 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1302 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58640] VGAM1303 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1303 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1303 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1303 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58641] VGAM1718 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1718 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1718 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1718 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58642] VGAM1719 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1719 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1719 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1719 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58643] It is appreciated that a function of VGR4222 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4222 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4222 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4222 gene: VGAM1298 host target protein, VGAM1299 host target protein, VGAM1300 host target protein, VGAM1301 host target protein, VGAM1302 host target protein, VGAM1303 host target protein, VGAM1718 host target protein and VGAM1719 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM1298, VGAM1299, VGAM1300, VGAM1301, VGAM1302, VGAM1303, VGAM1718 and VGAM1719

[58644] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4223(VGR4223) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58645] VGR4223 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4223 gene was detected is described hereinabove with reference to Figs. 6-15.

[58646] VGR4223 gene encodes VGR4223 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58647] VGR4223 precursor RNA folds spatially, forming VGR4223 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4223 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4223 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58648] VGR4223 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1722 precursor RNA, VGAM1724 precursor RNA, VGAM1855 precursor RNA, VGAM2027 precursor RNA, VGAM2429 precursor RNA, VGAM2494 precursor RNA, VGAM2495 precursor RNA and VGAM2499 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58649] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1722 RNA, VGAM1724 RNA, VGAM1855 RNA, VGAM2027 RNA, VGAM2429 RNA, VGAM2494 RNA, VGAM2495 RNA and VGAM2499 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58650] VGAM1722 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1722 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1722 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1722 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58651] VGAM1724 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1724 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1724 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1724 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58652] VGAM1855 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1855 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1855 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1855 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58653] VGAM2027 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM2027 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2027 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2027 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58654] VGAM2429 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2429 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2429 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2429 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58655] VGAM2494 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2494 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2494 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2494 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58656] VGAM2495 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2495 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2495 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2495 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58657] VGAM2499 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2499 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2499 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2499 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58658] It is appreciated that a function of VGR4223 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4223 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4223 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4223 gene: VGAM1722 host target protein, VGAM1724 host target protein,

VGAM1855 host target protein, VGAM2027 host target protein, VGAM2429 host target protein, VGAM2494 host target protein, VGAM2495 host target protein and VGAM2499 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1722, VGAM1724, VGAM1855, VGAM2027, VGAM2429, VGAM2494, VGAM2495 and VGAM2499

[58659] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4224(VGR4224) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58660] VGR4224 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4224 gene was detected is described hereinabove with reference to Figs. 6–15.

[58661] VGR4224 gene encodes VGR4224 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58662] VGR4224 precursor RNA folds spatially, forming VGR4224 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4224 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4224 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58663] VGR4224 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2500 precursor RNA, VGAM2624 precursor RNA, VGAM2809 precursor RNA, VGAM2986 precursor RNA, VGAM3061 precursor RNA, VGAM3173 precursor RNA, VGAM3174 precursor RNA and VGAM3370 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58664] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2500 RNA, VGAM2624 RNA, VGAM2809 RNA, VGAM2986 RNA, VGAM3061 RNA, VGAM3173 RNA, VGAM3174 RNA and VGAM3370 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58665] VGAM2500 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2500 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2500 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2500 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58666] VGAM2624 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2624 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2624 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2624 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58667] VGAM2809 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2809 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2809 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2809 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58668] VGAM2986 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2986 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2986 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2986 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58669] VGAM3061 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3061 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3061 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3061 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58670] VGAM3173 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3173 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3173 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3173 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58671] VGAM3174 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3174 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3174 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3174 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58672] VGAM3370 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3370 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3370 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3370 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58673] It is appreciated that a function of VGR4224 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4224 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4224 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4224 gene: VGAM2500 host target protein, VGAM2624 host target protein, VGAM2809 host target protein, VGAM2986 host target protein, VGAM3061 host target protein, VGAM3173 host target protein, VGAM3174 host target protein and VGAM3370 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2500, VGAM2624, VGAM2809, VGAM2986, VGAM3061, VGAM3173, VGAM3174 and VGAM3370

[58674] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4225(VGR4225) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[58675] VGR4225 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4225 gene was detected is described hereinabove with reference to Figs. 6–15.

[58676] VGR4225 gene encodes VGR4225 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58677] VGR4225 precursor RNA folds spatially, forming VGR4225 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4225 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4225 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58678] VGR4225 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM3402 precursor RNA, VGAM3442 precursor RNA, VGAM3674 precursor RNA and VGAM3800 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58679] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3402 RNA, VGAM3442 RNA, VGAM3674 RNA and VGAM3800 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58680] VGAM3402 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3402 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3402 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3402 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58681] VGAM3442 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3442 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3442 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3442 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58682] VGAM3674 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3674 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3674 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3674 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58683] VGAM3800 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3800 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3800 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3800 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58684] It is appreciated that a function of VGR4225 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4225 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4225 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4225 gene: VGAM3402 host target protein, VGAM3442 host target protein, VGAM3674 host target protein and VGAM3800 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3402, VGAM3442, VGAM3674 and VGAM3800

[58685] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4226(VGR4226) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58686] VGR4226 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4226 gene was detected is described hereinabove with reference to Figs. 6–15.

[58687] VGR4226 gene encodes VGR4226 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58688] VGR4226 precursor RNA folds spatially, forming VGR4226 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4226 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4226 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58689] VGR4226 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2246 precursor RNA, VGAM2247 precursor RNA and VGAM2793 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2

PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58690] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2246 RNA, VGAM2247 RNA and VGAM2793 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58691] VGAM2246 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2246 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2246 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2246 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58692] VGAM2247 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2247 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2247 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2247 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58693] VGAM2793 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2793 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2793 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2793 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[58694] It is appreciated that a function of VGR4226 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4226 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4226 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4226 gene: VGAM2246 host target protein, VGAM2247 host target protein and VGAM2793 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2246, VGAM2247 and VGAM2793

[58695] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4227(VGR4227) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[58696] VGR4227 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4227 gene was detected is described hereinabove with reference to Figs. 6–15.

[58697] VGR4227 gene encodes VGR4227 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58698] VGR4227 precursor RNA folds spatially, forming VGR4227 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4227 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4227 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58699] VGR4227 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1641 precursor RNA, VGAM1642 precursor RNA, VGAM1644 precursor RNA, VGAM1646 precursor RNA, VGAM1648 precursor RNA and VGAM2415 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58700] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1641 RNA, VGAM1642 RNA, VGAM1644 RNA, VGAM1646 RNA, VGAM1648 RNA and VGAM2415 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58701] VGAM1641 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1641 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1641 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1641 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58702] VGAM1642 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1642 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1642 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1642 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58703] VGAM1644 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1644 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1644 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1644 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58704] VGAM1646 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1646 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1646 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1646 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58705] VGAM1648 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM1648 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1648 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1648 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58706] VGAM2415 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2415 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2415 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2415 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58707] It is appreciated that a function of VGR4227 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4227 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4227 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4227 gene: VGAM1641 host target protein, VGAM1642 host target protein, VGAM1644 host target protein, VGAM1646 host target protein, VGAM1648 host target protein and VGAM2415 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1641, VGAM1642, VGAM1644, VGAM1646, VGAM1648 and VGAM2415

[58708] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4228(VGR4228) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58709] VGR4228 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4228 gene was detected is described hereinabove with reference to Figs. 6–15.

[58710] VGR4228 gene encodes VGR4228 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58711] VGR4228 precursor RNA folds spatially, forming VGR4228 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4228 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4228 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58712] VGR4228 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM884 precursor RNA, VGAM1684 precursor RNA, VGAM1693 precursor RNA, VGAM2318 precursor RNA, VGAM2339 precursor RNA, VGAM2340 precursor RNA, VGAM2609 precursor RNA and VGAM2661 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58713] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM884 RNA, VGAM1684 RNA, VGAM1693 RNA, VGAM2318 RNA, VGAM2339 RNA, VGAM2340 RNA, VGAM2609 RNA and VGAM2661 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58714] VGAM884 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM884 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM884 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM884 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58715] VGAM1684 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1684 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1684 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1684 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[58716] VGAM1693 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1693 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1693 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1693 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58717] VGAM2318 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2318 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2318 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2318 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58718] VGAM2339 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2339 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2339 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2339 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58719] VGAM2340 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2340 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2340 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2340 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58720] VGAM2609 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2609 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2609 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2609 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58721] VGAM2661 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2661 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2661 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM2661 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58722] It is appreciated that a function of VGR4228 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4228 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4228 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4228 gene: VGAM884 host target protein, VGAM1684 host target protein, VGAM1693 host target protein, VGAM2318 host target protein, VGAM2339 host target protein, VGAM2340 host target protein, VGAM2609 host target protein and VGAM2661 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM884, VGAM1684, VGAM1693, VGAM2318,

VGAM2339, VGAM2340, VGAM2609 and VGAM2661

[58723] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4229(VGR4229) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58724] VGR4229 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4229 gene was detected is described hereinabove with reference to Figs. 6–15.

[58725] VGR4229 gene encodes VGR4229 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58726] VGR4229 precursor RNA folds spatially, forming VGR4229 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4229 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4229 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58727] VGR4229 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM15 precursor RNA, VGAM24 precursor RNA, VGAM29 precursor RNA, VGAM33 precursor RNA, VGAM40 precursor RNA, VGAM54 precursor RNA, VGAM623 precursor RNA and VGAM624 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58728] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM15 RNA, VGAM24 RNA, VGAM29 RNA, VGAM33 RNA, VGAM40

RNA, VGAM54 RNA, VGAM623 RNA and VGAM624 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58729] VGAM15 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM15 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM15 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM15 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58730] VGAM24 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM24 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM24 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM24 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58731] VGAM29 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM29 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM29 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM29 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58732] VGAM33 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM33 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM33 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM33 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58733] VGAM40 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM40 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM40 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM40 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58734] VGAM54 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM54 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM54 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM54 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58735] VGAM623 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM623 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM623 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM623 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58736] VGAM624 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM624 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM624 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM624 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58737] It is appreciated that a function of VGR4229 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4229 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4229 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4229 gene: VGAM15 host target protein, VGAM24 host target protein, VGAM29 host target protein, VGAM33 host target protein, VGAM40 host target protein, VGAM54 host target protein, VGAM623

host target protein and VGAM624 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM15, VGAM24, VGAM29, VGAM33, VGAM40, VGAM54, VGAM623 and VGAM624

[58738] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4230(VGR4230) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58739] VGR4230 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4230 gene was detected is described hereinabove with reference to Figs. 6-15.

[58740] VGR4230 gene encodes VGR4230 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58741] VGR4230 precursor RNA folds spatially, forming VGR4230 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4230 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4230 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58742] VGR4230 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM726 precursor RNA, VGAM729 precursor RNA, VGAM870 precursor RNA, VGAM871 precursor RNA, VGAM872 precursor RNA, VGAM873 precursor RNA, VGAM963 precursor RNA and VGAM964 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58743] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM726 RNA, VGAM729 RNA, VGAM870 RNA, VGAM871 RNA, VGAM872 RNA, VGAM873 RNA, VGAM963 RNA and VGAM964 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58744] VGAM726 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM726 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM726 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM726 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58745] VGAM729 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM729 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM729 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM729 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58746] VGAM870 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM870 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM870 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM870 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58747] VGAM871 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM871 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM871 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM871 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58748] VGAM872 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM872 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM872 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM872 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58749] VGAM873 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM873 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM873 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM873 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58750] VGAM963 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM963 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM963 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM963 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58751] VGAM964 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM964 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM964 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM964 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58752] It is appreciated that a function of VGR4230 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4230 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4230 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4230 gene: VGAM726 host target protein, VGAM729 host target protein, VGAM870 host target protein, VGAM871 host target protein, VGAM872 host target protein, VGAM873 host target protein, VGAM963 host target protein and VGAM964 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM726, VGAM729, VGAM870, VGAM871, VGAM872, VGAM873, VGAM963 and VGAM964

[58753] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4231(VGR4231) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58754] VGR4231 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4231 gene was detected is described hereinabove with reference to Figs. 6–15.

[58755] VGR4231 gene encodes VGR4231 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58756] VGR4231 precursor RNA folds spatially, forming VGR4231 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4231 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4231 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58757] VGR4231 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1067 precursor RNA, VGAM1068 precursor RNA, VGAM1070 precursor RNA, VGAM1072 precursor RNA, VGAM1074 precursor RNA, VGAM1272 pre–

cursor RNA, VGAM1274 precursor RNA and VGAM1275 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58758] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1067 RNA, VGAM1068 RNA, VGAM1070 RNA, VGAM1072 RNA, VGAM1074 RNA, VGAM1272 RNA, VGAM1274 RNA and VGAM1275 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58759] VGAM1067 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1067 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1067 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1067 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58760] VGAM1068 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1068 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1068 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1068 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58761] VGAM1070 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1070 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1070 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1070 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58762] VGAM1072 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1072 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1072 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1072 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58763] VGAM1074 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1074 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1074 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1074 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58764] VGAM1272 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1272 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1272 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1272 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58765] VGAM1274 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM1274 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1274 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1274 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58766] VGAM1275 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1275 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1275 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1275 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58767] It is appreciated that a function of VGR4231 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4231 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4231 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4231 gene: VGAM1067 host target protein, VGAM1068 host target protein, VGAM1070 host target protein, VGAM1072 host target protein, VGAM1074 host target protein, VGAM1272 host target protein, VGAM1274 host target protein and VGAM1275 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1067, VGAM1068, VGAM1070, VGAM1072, VGAM1074, VGAM1272, VGAM1274 and VGAM1275

[58768] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4232(VGR4232) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58769] VGR4232 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4232 gene was detected is described hereinabove with reference to Figs. 6–15.

[58770] VGR4232 gene encodes VGR4232 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58771] VGR4232 precursor RNA folds spatially, forming VGR4232 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4232 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4232 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[58772] VGR4232 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1276 precursor RNA, VGAM1320 precursor RNA, VGAM1322 precursor RNA, VGAM1386 precursor RNA, VGAM1389 precursor RNA, VGAM1391 precursor RNA, VGAM1392 precursor RNA and VGAM1409 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58773] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1276 RNA, VGAM1320 RNA, VGAM1322 RNA, VGAM1386 RNA, VGAM1389 RNA, VGAM1391 RNA, VGAM1392 RNA and VGAM1409 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58774] VGAM1276 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1276 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1276 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1276 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58775] VGAM1320 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1320 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1320 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1320 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58776] VGAM1322 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1322 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1322 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1322 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58777] VGAM1386 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1386 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1386 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1386 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58778] VGAM1389 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1389 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1389 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1389 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58779] VGAM1391 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1391 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1391 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1391 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58780] VGAM1392 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1392 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1392 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1392 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58781] VGAM1409 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1409 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1409 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1409 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58782] It is appreciated that a function of VGR4232 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4232 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4232 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4232 gene: VGAM1276 host target protein, VGAM1320 host target protein, VGAM1322 host target protein, VGAM1386 host target protein, VGAM1389 host target protein, VGAM1391 host target protein, VGAM1392 host target protein and VGAM1409 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1276, VGAM1320, VGAM1322, VGAM1386, VGAM1389, VGAM1391, VGAM1392 and VGAM1409

[58783] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4233(VGR4233) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58784] VGR4233 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4233 gene was detected is described hereinabove with reference to Figs. 6–15.

[58785] VGR4233 gene encodes VGR4233 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58786] VGR4233 precursor RNA folds spatially, forming VGR4233 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4233 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4233 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58787] VGR4233 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1415 precursor RNA, VGAM1532 precursor RNA, VGAM1536 precursor RNA, VGAM1538 precursor RNA, VGAM1539 precursor RNA, VGAM1540 precursor RNA, VGAM1683 precursor RNA and VGAM1688 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58788] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1415 RNA, VGAM1532 RNA, VGAM1536 RNA, VGAM1538 RNA, VGAM1539 RNA, VGAM1540 RNA, VGAM1683 RNA and VGAM1688 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58789] VGAM1415 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1415 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1415 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1415 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58790] VGAM1532 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM1532 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1532 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1532 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58791] VGAM1536 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1536 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1536 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1536 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58792] VGAM1538 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1538 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1538 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1538 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58793] VGAM1539 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1539 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1539 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1539 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58794] VGAM1540 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1540 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1540 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1540 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58795] VGAM1683 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1683 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1683 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1683 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[58796] VGAM1688 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1688 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1688 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1688 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58797] It is appreciated that a function of VGR4233 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4233 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4233 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4233 gene: VGAM1415

host target protein, VGAM1532 host target protein, VGAM1536 host target protein, VGAM1538 host target protein, VGAM1539 host target protein, VGAM1540 host target protein, VGAM1683 host target protein and VGAM1688 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1415, VGAM1532, VGAM1536, VGAM1538, VGAM1539, VGAM1540, VGAM1683 and VGAM1688

[58798] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4234(VGR4234) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58799] VGR4234 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4234 gene was detected is described hereinabove with reference to Figs.

6-15.

[58800] VGR4234 gene encodes VGR4234 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58801] VGR4234 precursor RNA folds spatially, forming VGR4234 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4234 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4234 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58802] VGR4234 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1690 precursor RNA, VGAM1691 precursor RNA, VGAM1761 precursor RNA, VGAM1762 precursor RNA, VGAM1868 precursor RNA, VGAM1981 precursor RNA, VGAM1982 precursor RNA and VGAM2026 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58803] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1690 RNA, VGAM1691 RNA, VGAM1761 RNA, VGAM1762 RNA, VGAM1868 RNA, VGAM1981 RNA, VGAM1982 RNA and VGAM2026 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58804] VGAM1690 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1690 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1690 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1690 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58805] VGAM1691 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1691 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1691 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1691 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58806] VGAM1761 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1761 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1761 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1761 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58807] VGAM1762 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1762 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1762 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1762 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58808] VGAM1868 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1868 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1868 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1868 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58809] VGAM1981 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1981 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1981 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1981 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58810] VGAM1982 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1982 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1982 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1982 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58811] VGAM2026 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2026 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2026 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2026 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58812] It is appreciated that a function of VGR4234 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4234 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4234 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4234 gene: VGAM1690 host target protein, VGAM1691 host target protein, VGAM1761 host target protein, VGAM1762 host target protein, VGAM1868 host target protein, VGAM1981 host target protein, VGAM1982 host target protein and VGAM2026 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1690, VGAM1691, VGAM1761, VGAM1762, VGAM1868, VGAM1981, VGAM1982 and VGAM2026

[58813] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4235(VGR4235) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58814] VGR4235 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4235 gene was detected is described hereinabove with reference to Figs. 6–15.

[58815] VGR4235 gene encodes VGR4235 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58816] VGR4235 precursor RNA folds spatially, forming VGR4235 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4235 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4235 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58817] VGR4235 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2028 precursor RNA, VGAM2103 precursor RNA, VGAM2104 precursor RNA, VGAM2109 precursor RNA, VGAM2110 precursor RNA, VGAM2194 precursor RNA, VGAM2197 precursor RNA and VGAM2205 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58818] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2028 RNA, VGAM2103 RNA, VGAM2104 RNA, VGAM2109 RNA, VGAM2110 RNA, VGAM2194 RNA, VGAM2197 RNA and VGAM2205 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58819] VGAM2028 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2028 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2028 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2028 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58820] VGAM2103 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2103 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2103 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2103 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[58821] VGAM2104 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2104 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2104 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2104 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58822] VGAM2109 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2109 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2109 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2109 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58823] VGAM2110 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2110 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2110 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2110 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58824] VGAM2194 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2194 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2194 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2194 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58825] VGAM2197 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2197 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2197 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2197 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58826] VGAM2205 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2205 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2205 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM2205 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58827] It is appreciated that a function of VGR4235 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4235 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4235 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4235 gene: VGAM2028 host target protein, VGAM2103 host target protein, VGAM2104 host target protein, VGAM2109 host target protein, VGAM2110 host target protein, VGAM2194 host target protein, VGAM2197 host target protein and VGAM2205 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2028, VGAM2103, VGAM2104,

VGAM2109, VGAM2110, VGAM2194, VGAM2197 and VGAM2205

[58828] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4236(VGR4236) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58829] VGR4236 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4236 gene was detected is described hereinabove with reference to Figs. 6–15.

[58830] VGR4236 gene encodes VGR4236 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58831] VGR4236 precursor RNA folds spatially, forming VGR4236 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4236 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4236 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58832] VGR4236 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2220 precursor RNA, VGAM2234 precursor RNA, VGAM2288 precursor RNA, VGAM2289 precursor RNA, VGAM2314 precursor RNA, VGAM2391 precursor RNA, VGAM2416 precursor RNA and VGAM2417 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58833] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2220

RNA, VGAM2234 RNA, VGAM2288 RNA, VGAM2289 RNA, VGAM2314 RNA, VGAM2391 RNA, VGAM2416 RNA and VGAM2417 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58834] VGAM2220 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2220 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2220 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2220 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58835] VGAM2234 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2234 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2234 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2234 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58836] VGAM2288 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2288 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2288 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2288 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58837] VGAM2289 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2289 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2289 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2289 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58838] VGAM2314 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2314 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2314 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2314 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58839] VGAM2391 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM2391 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2391 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2391 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58840] VGAM2416 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2416 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2416 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2416 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58841] VGAM2417 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2417 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2417 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2417 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58842] It is appreciated that a function of VGR4236 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4236 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4236 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4236 gene: VGAM2220 host target protein, VGAM2234 host target protein, VGAM2288 host target protein, VGAM2289 host target

protein, VGAM2314 host target protein, VGAM2391 host target protein, VGAM2416 host target protein and VGAM2417 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2220, VGAM2234, VGAM2288, VGAM2289, VGAM2314, VGAM2391, VGAM2416 and VGAM2417

[58843] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4237(VGR4237) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58844] VGR4237 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4237 gene was detected is described hereinabove with reference to Figs. 6–15.

[58845] VGR4237 gene encodes VGR4237 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58846] VGR4237 precursor RNA folds spatially, forming VGR4237 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4237 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4237 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58847] VGR4237 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2422 precursor RNA, VGAM2423 precursor RNA, VGAM2437 precursor RNA, VGAM2459 precursor RNA, VGAM2517 precursor RNA, VGAM2634 precursor RNA, VGAM2635 precursor RNA and VGAM2745 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58848] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2422 RNA, VGAM2423 RNA, VGAM2437 RNA, VGAM2459 RNA, VGAM2517 RNA, VGAM2634 RNA, VGAM2635 RNA and VGAM2745 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58849] VGAM2422 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2422 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2422 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM2422 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58850] VGAM2423 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2423 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2423 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2423 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58851] VGAM2437 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2437 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2437 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM2437 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58852] VGAM2459 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2459 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2459 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2459 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58853] VGAM2517 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2517 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2517 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2517 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58854] VGAM2634 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2634 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2634 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2634 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58855] VGAM2635 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2635 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2635 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2635 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58856] VGAM2745 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2745 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2745 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2745 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58857] It is appreciated that a function of VGR4237 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4237 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4237 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4237 gene: VGAM2422 host target protein, VGAM2423 host target protein, VGAM2437 host target protein, VGAM2459 host target protein, VGAM2517 host target protein, VGAM2634 host target protein, VGAM2635 host target protein and VGAM2745 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2422, VGAM2423, VGAM2437, VGAM2459, VGAM2517, VGAM2634, VGAM2635 and VGAM2745

[58858] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4238(VGR4238) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[58859] VGR4238 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4238 gene was detected is described hereinabove with reference to Figs. 6–15.

[58860] VGR4238 gene encodes VGR4238 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58861] VGR4238 precursor RNA folds spatially, forming VGR4238 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4238 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4238 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58862] VGR4238 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM2831 precursor RNA, VGAM2898 precursor RNA, VGAM2904 precursor RNA, VGAM2967 precursor RNA, VGAM3133 precursor RNA, VGAM3134 precursor RNA, VGAM3188 precursor RNA and VGAM3201 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58863] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2831 RNA, VGAM2898 RNA, VGAM2904 RNA, VGAM2967 RNA, VGAM3133 RNA, VGAM3134 RNA, VGAM3188 RNA and VGAM3201 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58864] VGAM2831 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2831 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2831 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2831 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58865] VGAM2898 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2898 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2898 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2898 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58866] VGAM2904 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2904 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2904 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2904 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58867] VGAM2967 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2967 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2967 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2967 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58868] VGAM3133 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3133 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3133 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3133 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58869] VGAM3134 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3134 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3134 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3134 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[58870] VGAM3188 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3188 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3188 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3188 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58871] VGAM3201 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3201 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3201 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3201 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58872] It is appreciated that a function of VGR4238 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4238 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4238 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4238 gene: VGAM2831 host target protein, VGAM2898 host target protein, VGAM2904 host target protein, VGAM2967 host target protein, VGAM3133 host target protein, VGAM3134 host target protein, VGAM3188 host target protein and VGAM3201 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2831, VGAM2898, VGAM2904, VGAM2967, VGAM3133, VGAM3134, VGAM3188 and VGAM3201

[58873] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4239(VGR4239) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58874] VGR4239 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4239 gene was detected is described hereinabove with reference to Figs. 6–15.

[58875] VGR4239 gene encodes VGR4239 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58876] VGR4239 precursor RNA folds spatially, forming VGR4239 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4239 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4239 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58877] VGR4239 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3336 precursor RNA, VGAM3403 precursor RNA, VGAM3452 precursor RNA, VGAM3474 precursor RNA, VGAM3475 precursor RNA, VGAM3624 precursor RNA, VGAM3673 precursor RNA and VGAM3789 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58878] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3336 RNA, VGAM3403 RNA, VGAM3452 RNA, VGAM3474 RNA, VGAM3475 RNA, VGAM3624 RNA, VGAM3673 RNA and

VGAM3789 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58879] VGAM3336 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3336 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3336 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3336 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58880] VGAM3403 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3403 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3403 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3403 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58881] VGAM3452 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3452 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3452 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3452 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58882] VGAM3474 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3474 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3474 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3474 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58883] VGAM3475 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3475 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3475 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3475 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58884] VGAM3624 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3624 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3624 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3624 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58885] VGAM3673 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3673 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3673 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3673 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58886] VGAM3789 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3789 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3789 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3789 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58887] It is appreciated that a function of VGR4239 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4239 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4239 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4239 gene: VGAM3336 host target protein, VGAM3403 host target protein, VGAM3452 host target protein, VGAM3474 host target protein, VGAM3475 host target protein, VGAM3624 host target protein, VGAM3673 host target protein and

VGAM3789 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3336, VGAM3403, VGAM3452, VGAM3474, VGAM3475, VGAM3624, VGAM3673 and VGAM3789

[58888] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4240(VGR4240) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58889] VGR4240 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4240 gene was detected is described hereinabove with reference to Figs. 6-15.

[58890] VGR4240 gene encodes VGR4240 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58891] VGR4240 precursor RNA folds spatially, forming VGR4240 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4240 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4240 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58892] VGR4240 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM557 precursor RNA, VGAM559 precursor RNA, VGAM560 precursor RNA, VGAM562 precursor RNA, VGAM564 precursor RNA, VGAM565 precursor RNA, VGAM568 precursor RNA and VGAM569 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58893] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM557 RNA, VGAM559 RNA, VGAM560 RNA, VGAM562 RNA, VGAM564 RNA, VGAM565 RNA, VGAM568 RNA and VGAM569 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58894] VGAM557 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM557 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM557 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM557 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[58895] VGAM559 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM559 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM559 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM559 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58896] VGAM560 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM560 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM560 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM560 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58897] VGAM562 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM562 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM562 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM562 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58898] VGAM564 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM564 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM564 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM564 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58899] VGAM565 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM565 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM565 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM565 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58900] VGAM568 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM568 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM568 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM568 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58901] VGAM569 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM569 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM569 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM569 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58902] It is appreciated that a function of VGR4240 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4240 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4240 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4240 gene: VGAM557 host target protein, VGAM559 host target protein, VGAM560 host target protein, VGAM562 host target protein, VGAM564 host target protein, VGAM565 host target protein, VGAM568 host target protein and VGAM569 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM557, VGAM559, VGAM560, VGAM562, VGAM564, VGAM565, VGAM568 and VGAM569

[58903] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4241(VGR4241) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58904] VGR4241 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4241 gene was detected is described hereinabove with reference to Figs. 6–15.

[58905] VGR4241 gene encodes VGR4241 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58906] VGR4241 precursor RNA folds spatially, forming VGR4241 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4241 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4241 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58907] VGR4241 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM845 precursor RNA, VGAM942 precursor RNA, VGAM943 precursor RNA, VGAM944 precursor RNA, VGAM945 precursor RNA, VGAM1156 precursor

RNA, VGAM1157 precursor RNA and VGAM1163 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58908] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM845 RNA, VGAM942 RNA, VGAM943 RNA, VGAM944 RNA, VGAM945 RNA, VGAM1156 RNA, VGAM1157 RNA and VGAM1163 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58909] VGAM845 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM845 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM845 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM845 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58910] VGAM942 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM942 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM942 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM942 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58911] VGAM943 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM943 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM943 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM943 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58912] VGAM944 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM944 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM944 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM944 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58913] VGAM945 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM945 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM945 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM945 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58914] VGAM1156 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1156 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1156 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1156 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58915] VGAM1157 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM1157 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1157 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1157 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58916] VGAM1163 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1163 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1163 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1163 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58917] It is appreciated that a function of VGR4241 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4241 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4241 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4241 gene: VGAM845 host target protein, VGAM942 host target protein, VGAM943 host target protein, VGAM944 host target protein, VGAM945 host target protein, VGAM1156 host target protein, VGAM1157 host target protein and VGAM1163 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM845, VGAM942, VGAM943, VGAM944, VGAM945, VGAM1156, VGAM1157 and VGAM1163

[58918] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4242(VGR4242) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58919] VGR4242 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4242 gene was detected is described hereinabove with reference to Figs. 6–15.

[58920] VGR4242 gene encodes VGR4242 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58921] VGR4242 precursor RNA folds spatially, forming VGR4242 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4242 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4242 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58922] VGR4242 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1164 precursor RNA, VGAM1165 precursor RNA, VGAM1270 precursor RNA, VGAM1287 precursor RNA, VGAM1324 precursor RNA, VGAM1338 precursor RNA, VGAM1728 precursor RNA and VGAM1729 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58923] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1164 RNA, VGAM1165 RNA, VGAM1270 RNA, VGAM1287 RNA, VGAM1324 RNA, VGAM1338 RNA, VGAM1728 RNA and VGAM1729 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[58924] VGAM1164 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1164 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1164 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1164 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58925] VGAM1165 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1165 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1165 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1165 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58926] VGAM1270 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1270 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1270 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1270 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58927] VGAM1287 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1287 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1287 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM1287 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58928] VGAM1324 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1324 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1324 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1324 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58929] VGAM1338 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1338 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1338 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1338 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58930] VGAM1728 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1728 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1728 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1728 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58931] VGAM1729 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1729 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1729 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1729 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58932] It is appreciated that a function of VGR4242 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4242 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4242 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4242 gene: VGAM1164 host target protein, VGAM1165 host target protein, VGAM1270 host target protein, VGAM1287 host target protein, VGAM1324 host target protein, VGAM1338 host target protein, VGAM1728 host target protein and VGAM1729 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM1164, VGAM1165, VGAM1270, VGAM1287, VGAM1324, VGAM1338, VGAM1728 and VGAM1729

[58933] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4243(VGR4243) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58934] VGR4243 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4243 gene was detected is described hereinabove with reference to Figs. 6–15.

[58935] VGR4243 gene encodes VGR4243 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58936] VGR4243 precursor RNA folds spatially, forming VGR4243 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4243 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4243 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58937] VGR4243 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1732 precursor RNA, VGAM1736 precursor RNA, VGAM1742 precursor RNA, VGAM2085 precursor RNA, VGAM2193 precursor RNA, VGAM2281 precursor RNA, VGAM2315 precursor RNA and VGAM2316 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58938] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1732 RNA, VGAM1736 RNA, VGAM1742 RNA, VGAM2085 RNA, VGAM2193 RNA, VGAM2281 RNA, VGAM2315 RNA and VGAM2316 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58939] VGAM1732 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1732 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1732 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1732 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58940] VGAM1736 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1736 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1736 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1736 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58941] VGAM1742 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1742 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1742 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1742 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58942] VGAM2085 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM2085 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2085 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2085 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58943] VGAM2193 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2193 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2193 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2193 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58944] VGAM2281 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2281 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2281 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2281 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58945] VGAM2315 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2315 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2315 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2315 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58946] VGAM2316 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2316 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2316 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2316 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58947] It is appreciated that a function of VGR4243 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4243 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4243 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4243 gene: VGAM1732 host target protein, VGAM1736 host target protein,

VGAM1742 host target protein, VGAM2085 host target protein, VGAM2193 host target protein, VGAM2281 host target protein, VGAM2315 host target protein and VGAM2316 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1732, VGAM1736, VGAM1742, VGAM2085, VGAM2193, VGAM2281, VGAM2315 and VGAM2316

[58948] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4244(VGR4244) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58949] VGR4244 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4244 gene was detected is described hereinabove with reference to Figs. 6-15.

[58950] VGR4244 gene encodes VGR4244 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58951] VGR4244 precursor RNA folds spatially, forming VGR4244 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4244 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4244 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58952] VGR4244 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2331 precursor RNA, VGAM2332 precursor RNA, VGAM2333 precursor RNA, VGAM2355 precursor RNA, VGAM2591 precursor RNA, VGAM2592 precursor RNA, VGAM2593 precursor RNA and VGAM2598 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58953] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2331 RNA, VGAM2332 RNA, VGAM2333 RNA, VGAM2355 RNA, VGAM2591 RNA, VGAM2592 RNA, VGAM2593 RNA and VGAM2598 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58954] VGAM2331 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2331 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2331 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2331 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58955] VGAM2332 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2332 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2332 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2332 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58956] VGAM2333 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2333 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2333 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2333 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58957] VGAM2355 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2355 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2355 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2355 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58958] VGAM2591 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2591 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2591 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2591 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58959] VGAM2592 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2592 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2592 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2592 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58960] VGAM2593 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2593 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2593 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2593 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58961] VGAM2598 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2598 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2598 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2598 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58962] It is appreciated that a function of VGR4244 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4244 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4244 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4244 gene: VGAM2331 host target protein, VGAM2332 host target protein, VGAM2333 host target protein, VGAM2355 host target protein, VGAM2591 host target protein, VGAM2592 host target protein, VGAM2593 host target protein and VGAM2598 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2331, VGAM2332, VGAM2333, VGAM2355, VGAM2591, VGAM2592, VGAM2593 and VGAM2598

[58963] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4245(VGR4245) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[58964] VGR4245 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4245 gene was detected is described hereinabove with reference to Figs. 6–15.

[58965] VGR4245 gene encodes VGR4245 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58966] VGR4245 precursor RNA folds spatially, forming VGR4245 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4245 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4245 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[58967] VGR4245 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3056 precursor RNA, VGAM3256 precursor RNA, VGAM3257 precursor RNA, VGAM3425 precursor RNA, VGAM3426 precursor RNA, VGAM3427 precursor RNA, VGAM3548 precursor RNA and VGAM3595 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58968] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3056 RNA, VGAM3256 RNA, VGAM3257 RNA, VGAM3425 RNA, VGAM3426 RNA, VGAM3427 RNA, VGAM3548 RNA and VGAM3595 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58969] VGAM3056 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3056 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3056 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3056 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58970] VGAM3256 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3256 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3256 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3256 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58971] VGAM3257 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3257 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3257 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3257 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58972] VGAM3425 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3425 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3425 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3425 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[58973] VGAM3426 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3426 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3426 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3426 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[58974] VGAM3427 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3427 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3427 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3427 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[58975] VGAM3548 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3548 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3548 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3548 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[58976] VGAM3595 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3595 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3595 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM3595 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[58977] It is appreciated that a function of VGR4245 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4245 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4245 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4245 gene: VGAM3056 host target protein, VGAM3256 host target protein, VGAM3257 host target protein, VGAM3425 host target protein, VGAM3426 host target protein, VGAM3427 host target protein, VGAM3548 host target protein and VGAM3595 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3056, VGAM3256, VGAM3257, VGAM3425, VGAM3426, VGAM3427, VGAM3548 and

VGAM3595

[58978] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4246(VGR4246) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58979] VGR4246 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4246 gene was detected is described hereinabove with reference to Figs. 6–15.

[58980] VGR4246 gene encodes VGR4246 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58981] VGR4246 precursor RNA folds spatially, forming VGR4246 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4246 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4246 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[58982] VGR4246 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM3763 precursor RNA, VGAM3772 precursor RNA, VGAM3788 precursor RNA and VGAM3801 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58983] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3763 RNA, VGAM3772 RNA, VGAM3788 RNA and VGAM3801 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to

VGAM RNA of Fig. 8.

[58984] VGAM3763 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3763 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3763 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3763 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58985] VGAM3772 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3772 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3772 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3772 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58986] VGAM3788 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3788 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3788 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3788 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58987] VGAM3801 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3801 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3801 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM3801 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[58988] It is appreciated that a function of VGR4246 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4246 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4246 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4246 gene: VGAM3763 host target protein, VGAM3772 host target protein, VGAM3788 host target protein and VGAM3801 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3763, VGAM3772, VGAM3788 and VGAM3801

[58989] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4247(VGR4247) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[58990] VGR4247 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4247 gene was detected is described hereinabove with reference to Figs. 6–15.

[58991] VGR4247 gene encodes VGR4247 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[58992] VGR4247 precursor RNA folds spatially, forming VGR4247 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4247 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4247 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[58993] VGR4247 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1076 precursor RNA, VGAM1078 precursor RNA and VGAM1079 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[58994] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1076 RNA, VGAM1078 RNA and VGAM1079 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[58995] VGAM1076 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1076 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1076 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1076 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[58996] VGAM1078 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1078 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1078 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1078 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[58997] VGAM1079 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1079 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1079 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1079 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[58998] It is appreciated that a function of VGR4247 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4247 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4247 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4247 gene: VGAM1076 host target protein, VGAM1078 host target protein and VGAM1079 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM1076, VGAM1078 and VGAM1079

[58999] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4248(VGR4248) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59000] VGR4248 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4248 gene was detected is described hereinabove with reference to Figs. 6–15.

[59001] VGR4248 gene encodes VGR4248 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59002] VGR4248 precursor RNA folds spatially, forming VGR4248 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4248 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4248 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59003] VGR4248 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2430 precursor RNA and VGAM3779 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59004] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2430 RNA and VGAM3779 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59005] VGAM2430 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2430 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2430 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2430 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59006] VGAM3779 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3779 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3779 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3779 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59007] It is appreciated that a function of VGR4248 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4248 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4248 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4248 gene: VGAM2430 host target protein and VGAM3779 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2430 and VGAM3779

[59008] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4249(VGR4249) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59009] VGR4249 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4249 gene was detected is described hereinabove with reference to Figs. 6–15.

[59010] VGR4249 gene encodes VGR4249 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59011] VGR4249 precursor RNA folds spatially, forming VGR4249 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4249 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4249 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59012] VGR4249 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM163 precursor RNA, VGAM179 precursor RNA, VGAM296 precursor RNA, VGAM308 precursor

RNA, VGAM795 precursor RNA, VGAM931 precursor RNA, VGAM932 precursor RNA and VGAM1084 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59013] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM163 RNA, VGAM179 RNA, VGAM296 RNA, VGAM308 RNA, VGAM795 RNA, VGAM931 RNA, VGAM932 RNA and VGAM1084 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59014] VGAM163 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM163 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM163 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM163 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59015] VGAM179 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM179 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM179 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM179 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59016] VGAM296 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM296 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM296 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM296 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59017] VGAM308 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM308 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM308 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM308 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59018] VGAM795 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM795 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM795 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM795 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59019] VGAM931 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM931 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM931 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM931 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59020] VGAM932 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM932 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM932 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM932 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59021] VGAM1084 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1084 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1084 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1084 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59022] It is appreciated that a function of VGR4249 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4249 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4249 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4249 gene: VGAM163 host target protein, VGAM179 host target protein, VGAM296 host target protein, VGAM308 host target protein, VGAM795 host target protein, VGAM931 host target protein, VGAM932 host target protein and VGAM1084 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM163, VGAM179, VGAM296, VGAM308, VGAM795, VGAM931, VGAM932 and VGAM1084

[59023] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4250(VGR4250) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59024] VGR4250 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4250 gene was detected is described hereinabove with reference to Figs. 6–15.

[59025] VGR4250 gene encodes VGR4250 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59026] VGR4250 precursor RNA folds spatially, forming VGR4250 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4250 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4250 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[59027] VGR4250 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1162 precursor RNA, VGAM1677 precursor RNA, VGAM1678 precursor RNA, VGAM1679 precursor RNA, VGAM1682 precursor RNA, VGAM2044 precursor RNA, VGAM2045 precursor RNA and VGAM2121 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59028] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1162 RNA, VGAM1677 RNA, VGAM1678 RNA, VGAM1679 RNA, VGAM1682 RNA, VGAM2044 RNA, VGAM2045 RNA and VGAM2121 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59029] VGAM1162 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1162 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1162 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1162 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59030] VGAM1677 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1677 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1677 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1677 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59031] VGAM1678 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1678 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1678 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1678 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59032] VGAM1679 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1679 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1679 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1679 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59033] VGAM1682 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1682 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1682 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1682 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59034] VGAM2044 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2044 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2044 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2044 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59035] VGAM2045 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2045 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2045 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2045 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59036] VGAM2121 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2121 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2121 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2121 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59037] It is appreciated that a function of VGR4250 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4250 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4250 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4250 gene: VGAM1162 host target protein, VGAM1677 host target protein, VGAM1678 host target protein, VGAM1679 host target protein, VGAM1682 host target protein, VGAM2044 host target protein, VGAM2045 host target protein and VGAM2121 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM1162, VGAM1677, VGAM1678, VGAM1679, VGAM1682, VGAM2044, VGAM2045 and VGAM2121

[59038] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4251(VGR4251) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59039] VGR4251 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4251 gene was detected is described hereinabove with reference to Figs. 6–15.

[59040] VGR4251 gene encodes VGR4251 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59041] VGR4251 precursor RNA folds spatially, forming VGR4251 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4251 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4251 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59042] VGR4251 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2377 precursor RNA, VGAM2378 precursor RNA, VGAM2470 precursor RNA, VGAM2476 precursor RNA, VGAM2477 precursor RNA, VGAM2690 precursor RNA, VGAM2691 precursor RNA and VGAM2810 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59043] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2377 RNA, VGAM2378 RNA, VGAM2470 RNA, VGAM2476 RNA, VGAM2477 RNA, VGAM2690 RNA, VGAM2691 RNA and VGAM2810 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59044] VGAM2377 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2377 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2377 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2377 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59045] VGAM2378 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2378 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2378 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2378 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59046] VGAM2470 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2470 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2470 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2470 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59047] VGAM2476 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2476 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2476 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2476 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59048] VGAM2477 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2477 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2477 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2477 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59049] VGAM2690 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2690 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2690 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2690 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59050] VGAM2691 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2691 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2691 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2691 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[59051] VGAM2810 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2810 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2810 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2810 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59052] It is appreciated that a function of VGR4251 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4251 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4251 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4251 gene: VGAM2377

host target protein, VGAM2378 host target protein, VGAM2470 host target protein, VGAM2476 host target protein, VGAM2477 host target protein, VGAM2690 host target protein, VGAM2691 host target protein and VGAM2810 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2377, VGAM2378, VGAM2470, VGAM2476, VGAM2477, VGAM2690, VGAM2691 and VGAM2810

[59053] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4252(VGR4252) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59054] VGR4252 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4252 gene was detected is described hereinabove with reference to Figs.

6-15.

[59055] VGR4252 gene encodes VGR4252 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59056] VGR4252 precursor RNA folds spatially, forming VGR4252 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4252 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4252 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59057] VGR4252 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2823 precursor RNA, VGAM2824 precursor RNA, VGAM2825 precursor RNA, VGAM2826 precursor RNA, VGAM3031 precursor RNA, VGAM3032 precursor RNA, VGAM3090 precursor RNA and VGAM3102 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59058] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2823 RNA, VGAM2824 RNA, VGAM2825 RNA, VGAM2826 RNA, VGAM3031 RNA, VGAM3032 RNA, VGAM3090 RNA and VGAM3102 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59059] VGAM2823 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2823 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2823 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2823 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59060] VGAM2824 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2824 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2824 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2824 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59061] VGAM2825 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2825 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2825 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2825 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59062] VGAM2826 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2826 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2826 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2826 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59063] VGAM3031 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3031 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3031 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3031 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59064] VGAM3032 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3032 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3032 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3032 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59065] VGAM3090 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3090 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3090 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3090 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59066] VGAM3102 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3102 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3102 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3102 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59067] It is appreciated that a function of VGR4252 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4252 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4252 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4252 gene: VGAM2823 host target protein, VGAM2824 host target protein, VGAM2825 host target protein, VGAM2826 host target protein, VGAM3031 host target protein, VGAM3032 host target protein, VGAM3090 host target protein and VGAM3102 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2823, VGAM2824, VGAM2825, VGAM2826, VGAM3031, VGAM3032, VGAM3090 and VGAM3102

[59068] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4253(VGR4253) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59069] VGR4253 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4253 gene was detected is described hereinabove with reference to Figs. 6–15.

[59070] VGR4253 gene encodes VGR4253 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59071] VGR4253 precursor RNA folds spatially, forming VGR4253 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4253 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4253 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59072] VGR4253 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3103 precursor RNA, VGAM3136 precursor RNA, VGAM3196 precursor RNA, VGAM3197 precursor RNA, VGAM3235 precursor RNA, VGAM3236 precursor RNA, VGAM3457 precursor RNA and VGAM3504 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59073] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3103 RNA, VGAM3136 RNA, VGAM3196 RNA, VGAM3197 RNA, VGAM3235 RNA, VGAM3236 RNA, VGAM3457 RNA and VGAM3504 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59074] VGAM3103 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3103 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3103 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3103 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59075] VGAM3136 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3136 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3136 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3136 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[59076] VGAM3196 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3196 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3196 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3196 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59077] VGAM3197 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3197 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3197 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3197 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59078] VGAM3235 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3235 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3235 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3235 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59079] VGAM3236 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3236 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3236 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM3236 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59080] VGAM3457 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3457 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3457 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3457 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59081] VGAM3504 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3504 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3504 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM3504 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59082] It is appreciated that a function of VGR4253 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4253 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4253 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4253 gene: VGAM3103 host target protein, VGAM3136 host target protein, VGAM3196 host target protein, VGAM3197 host target protein, VGAM3235 host target protein, VGAM3236 host target protein, VGAM3457 host target protein and VGAM3504 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3103, VGAM3136, VGAM3196,

VGAM3197, VGAM3235, VGAM3236, VGAM3457 and VGAM3504

[59083] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4254(VGR4254) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59084] VGR4254 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4254 gene was detected is described hereinabove with reference to Figs. 6–15.

[59085] VGR4254 gene encodes VGR4254 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59086] VGR4254 precursor RNA folds spatially, forming VGR4254 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4254 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4254 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59087] VGR4254 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3555 precursor RNA, VGAM3560 precursor RNA, VGAM3619 precursor RNA, VGAM3672 precursor RNA, VGAM3758 precursor RNA, VGAM3773 precursor RNA, VGAM3784 precursor RNA and VGAM3802 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59088] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3555

RNA, VGAM3560 RNA, VGAM3619 RNA, VGAM3672 RNA, VGAM3758 RNA, VGAM3773 RNA, VGAM3784 RNA and VGAM3802 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59089] VGAM3555 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3555 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3555 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3555 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59090] VGAM3560 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3560 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3560 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3560 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59091] VGAM3619 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3619 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3619 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3619 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59092] VGAM3672 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3672 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3672 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3672 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59093] VGAM3758 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3758 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3758 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3758 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59094] VGAM3773 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM3773 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3773 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3773 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59095] VGAM3784 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3784 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3784 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3784 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59096] VGAM3802 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3802 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3802 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3802 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59097] It is appreciated that a function of VGR4254 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4254 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4254 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4254 gene: VGAM3555 host target protein, VGAM3560 host target protein, VGAM3619 host target protein, VGAM3672 host target

protein, VGAM3758 host target protein, VGAM3773 host target protein, VGAM3784 host target protein and VGAM3802 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3555, VGAM3560, VGAM3619, VGAM3672, VGAM3758, VGAM3773, VGAM3784 and VGAM3802

[59098] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4255(VGR4255) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59099] VGR4255 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4255 gene was detected is described hereinabove with reference to Figs. 6-15.

[59100] VGR4255 gene encodes VGR4255 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59101] VGR4255 precursor RNA folds spatially, forming VGR4255 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4255 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4255 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59102] VGR4255 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3803 precursor RNA and VGAM3814 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59103] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3803 RNA and VGAM3814 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59104] VGAM3803 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3803 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3803 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3803 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59105] VGAM3814 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3814 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3814 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3814 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59106] It is appreciated that a function of VGR4255 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4255 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4255 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4255 gene: VGAM3803 host target protein and VGAM3814 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3803 and VGAM3814

[59107] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4256(VGR4256) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59108] VGR4256 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4256 gene was detected is described hereinabove with reference to Figs. 6–15.

[59109] VGR4256 gene encodes VGR4256 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59110] VGR4256 precursor RNA folds spatially, forming VGR4256 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4256 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4256 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59111] VGR4256 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM328 precursor RNA, VGAM849 precursor RNA, VGAM1104 precursor RNA, VGAM1650 precursor RNA, VGAM1653 precursor RNA, VGAM1654 precursor RNA, VGAM1655 precursor RNA and VGAM1994 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59112] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM328 RNA, VGAM849 RNA, VGAM1104 RNA, VGAM1650 RNA, VGAM1653 RNA, VGAM1654 RNA, VGAM1655 RNA and VGAM1994 RNA respectively, herein schematically repre-

sented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59113] VGAM328 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM328 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM328 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM328 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59114] VGAM849 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM849 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM849 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM849 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59115] VGAM1104 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1104 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1104 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1104 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59116] VGAM1650 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1650 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1650 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1650 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59117] VGAM1653 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1653 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1653 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1653 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59118] VGAM1654 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1654 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1654 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1654 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59119] VGAM1655 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1655 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1655 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1655 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59120] VGAM1994 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1994 host target RNA, herein schematically represented by VGAM8

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1994 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1994 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59121] It is appreciated that a function of VGR4256 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4256 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4256 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4256 gene: VGAM328 host target protein, VGAM849 host target protein, VGAM1104 host target protein, VGAM1650 host target protein, VGAM1653 host target protein, VGAM1654 host target protein, VGAM1655 host target protein and VGAM1994 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM328, VGAM849, VGAM1104, VGAM1650, VGAM1653, VGAM1654, VGAM1655 and VGAM1994

[59122] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4257(VGR4257) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59123] VGR4257 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4257 gene was detected is described hereinabove with reference to Figs. 6–15.

[59124] VGR4257 gene encodes VGR4257 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59125] VGR4257 precursor RNA folds spatially, forming VGR4257 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4257 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4257 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[59126] VGR4257 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2180 precursor RNA, VGAM2239 precursor RNA, VGAM2306 precursor RNA, VGAM2567 precursor RNA, VGAM2673 precursor RNA, VGAM2789 precursor RNA, VGAM2790 precursor RNA and VGAM2791 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59127] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2180 RNA, VGAM2239 RNA, VGAM2306 RNA, VGAM2567 RNA, VGAM2673 RNA, VGAM2789 RNA, VGAM2790 RNA and VGAM2791 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59128] VGAM2180 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2180 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2180 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2180 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59129] VGAM2239 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2239 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2239 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM2239 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59130] VGAM2306 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2306 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2306 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2306 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59131] VGAM2567 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2567 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2567 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM2567 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59132] VGAM2673 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2673 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2673 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2673 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59133] VGAM2789 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2789 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2789 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2789 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59134] VGAM2790 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2790 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2790 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2790 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59135] VGAM2791 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2791 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2791 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2791 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59136] It is appreciated that a function of VGR4257 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4257 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4257 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4257 gene: VGAM2180 host target protein, VGAM2239 host target protein, VGAM2306 host target protein, VGAM2567 host target protein, VGAM2673 host target protein, VGAM2789 host target protein, VGAM2790 host target protein and VGAM2791 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM2180, VGAM2239, VGAM2306, VGAM2567, VGAM2673, VGAM2789, VGAM2790 and VGAM2791

[59137] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4258(VGR4258) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59138] VGR4258 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4258 gene was detected is described hereinabove with reference to Figs. 6–15.

[59139] VGR4258 gene encodes VGR4258 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59140] VGR4258 precursor RNA folds spatially, forming VGR4258 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4258 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4258 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59141] VGR4258 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2792 precursor RNA, VGAM2971 precursor RNA, VGAM3276 precursor RNA, VGAM3277 precursor RNA, VGAM3349 precursor RNA, VGAM3385 precursor RNA, VGAM3445 precursor RNA and VGAM3447 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59142] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2792 RNA, VGAM2971 RNA, VGAM3276 RNA, VGAM3277 RNA, VGAM3349 RNA, VGAM3385 RNA, VGAM3445 RNA and VGAM3447 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59143] VGAM2792 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2792 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2792 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2792 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59144] VGAM2971 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2971 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2971 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2971 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59145] VGAM3276 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3276 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3276 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3276 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59146] VGAM3277 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3277 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3277 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3277 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59147] VGAM3349 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3349 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3349 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3349 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59148] VGAM3385 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3385 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3385 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3385 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59149] VGAM3445 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3445 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3445 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3445 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[59150] VGAM3447 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3447 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3447 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3447 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59151] It is appreciated that a function of VGR4258 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4258 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4258 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4258 gene: VGAM2792

host target protein, VGAM2971 host target protein, VGAM3276 host target protein, VGAM3277 host target protein, VGAM3349 host target protein, VGAM3385 host target protein, VGAM3445 host target protein and VGAM3447 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2792, VGAM2971, VGAM3276, VGAM3277, VGAM3349, VGAM3385, VGAM3445 and VGAM3447

[59152] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4259(VGR4259) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59153] VGR4259 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4259 gene was detected is described hereinabove with reference to Figs.

6-15.

[59154] VGR4259 gene encodes VGR4259 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59155] VGR4259 precursor RNA folds spatially, forming VGR4259 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4259 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4259 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59156] VGR4259 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3556 precursor RNA, VGAM3594 precursor RNA and VGAM3609 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA

segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59157] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3556 RNA, VGAM3594 RNA and VGAM3609 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59158] VGAM3556 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3556 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3556 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3556 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59159] VGAM3594 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM3594 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3594 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3594 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59160] VGAM3609 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3609 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3609 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3609 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59161] It is appreciated that a function of VGR4259 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4259 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4259 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4259 gene: VGAM3556 host target protein, VGAM3594 host target protein and VGAM3609 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3556, VGAM3594 and VGAM3609

[59162] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4260(VGR4260) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59163] VGR4260 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4260 gene was detected is described hereinabove with reference to Figs. 6–15.

[59164] VGR4260 gene encodes VGR4260 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59165] VGR4260 precursor RNA folds spatially, forming VGR4260 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4260 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4260 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59166] VGR4260 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM545 precursor RNA, VGAM548 precursor

sor RNA and VGAM2717 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59167] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM545 RNA, VGAM548 RNA and VGAM2717 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59168] VGAM545 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM545 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM545 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM545 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[59169] VGAM548 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM548 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM548 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM548 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59170] VGAM2717 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2717 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2717 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2717 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59171] It is appreciated that a function of VGR4260 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4260 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4260 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4260 gene: VGAM545 host target protein, VGAM548 host target protein and VGAM2717 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM545, VGAM548 and VGAM2717

[59172] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4261(VGR4261) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59173] VGR4261 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4261 gene was detected is described hereinabove with reference to Figs. 6–15.

[59174] VGR4261 gene encodes VGR4261 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59175] VGR4261 precursor RNA folds spatially, forming VGR4261 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4261 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4261 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59176] VGR4261 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2439 precursor RNA and VGAM3300 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59177] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2439 RNA and VGAM3300 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59178] VGAM2439 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2439 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2439 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2439 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59179] VGAM3300 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3300 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3300 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3300 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59180] It is appreciated that a function of VGR4261 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4261 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4261 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4261 gene: VGAM2439 host target protein and VGAM3300 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2439 and VGAM3300

[59181] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4262(VGR4262) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59182] VGR4262 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4262 gene was detected is described hereinabove with reference to Figs. 6–15.

[59183] VGR4262 gene encodes VGR4262 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[59184] VGR4262 precursor RNA folds spatially, forming VGR4262 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4262 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4262 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59185] VGR4262 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM157 precursor RNA, VGAM164 precursor RNA, VGAM434 precursor RNA, VGAM435 precursor RNA, VGAM436 precursor RNA, VGAM437 precursor RNA and VGAM719 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a

hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59186] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM157 RNA, VGAM164 RNA, VGAM434 RNA, VGAM435 RNA, VGAM436 RNA, VGAM437 RNA and VGAM719 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59187] VGAM157 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM157 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM157 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM157 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59188] VGAM164 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM164 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM164 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM164 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59189] VGAM434 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM434 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM434 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM434 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[59190] VGAM435 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM435 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM435 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM435 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59191] VGAM436 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM436 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM436 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM436 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59192] VGAM437 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM437 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM437 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM437 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59193] VGAM719 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM719 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM719 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM719 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59194] It is appreciated that a function of VGR4262 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4262 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4262 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4262 gene: VGAM157 host target protein, VGAM164 host target protein, VGAM434 host target protein, VGAM435 host target protein, VGAM436 host target protein, VGAM437 host target protein and VGAM719 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM157, VGAM164, VGAM434, VGAM435, VGAM436, VGAM437 and VGAM719

[59195] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4263(VGR4263) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59196] VGR4263 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4263 gene was detected is described hereinabove with reference to Figs. 6–15.

[59197] VGR4263 gene encodes VGR4263 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59198] VGR4263 precursor RNA folds spatially, forming VGR4263 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4263 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4263 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59199] VGR4263 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM721 precursor RNA, VGAM722 precursor RNA, VGAM723 precursor RNA, VGAM1018 precursor RNA, VGAM1019 precursor RNA, VGAM1055 precursor RNA, VGAM1058 precursor RNA and VGAM1059 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59200] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM721 RNA, VGAM722 RNA, VGAM723 RNA, VGAM1018 RNA, VGAM1019 RNA, VGAM1055 RNA, VGAM1058 RNA and VGAM1059 RNA respectively, herein schematically repre-

sented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59201] VGAM721 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM721 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM721 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM721 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59202] VGAM722 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM722 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM722 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM722 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59203] VGAM723 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM723 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM723 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM723 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59204] VGAM1018 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1018 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1018 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1018 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59205] VGAM1019 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1019 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1019 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1019 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59206] VGAM1055 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1055 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1055 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1055 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59207] VGAM1058 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1058 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1058 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1058 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59208] VGAM1059 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1059 host target RNA, herein schematically represented by VGAM8

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1059 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1059 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59209] It is appreciated that a function of VGR4263 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4263 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4263 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4263 gene: VGAM721 host target protein, VGAM722 host target protein, VGAM723 host target protein, VGAM1018 host target protein, VGAM1019 host target protein, VGAM1055 host target protein, VGAM1058 host target protein and VGAM1059 host target protein, herein schematically represented by

VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM721, VGAM722, VGAM723, VGAM1018, VGAM1019, VGAM1055, VGAM1058 and VGAM1059

[59210] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4264(VGR4264) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59211] VGR4264 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4264 gene was detected is described hereinabove with reference to Figs. 6-15.

[59212] VGR4264 gene encodes VGR4264 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59213] VGR4264 precursor RNA folds spatially, forming VGR4264 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4264 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4264 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59214] VGR4264 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1060 precursor RNA, VGAM1061 precursor RNA, VGAM1123 precursor RNA, VGAM1126 precursor RNA, VGAM1429 precursor RNA, VGAM1448 precursor RNA, VGAM1611 precursor RNA and VGAM1615 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59215] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1060 RNA, VGAM1061 RNA, VGAM1123 RNA, VGAM1126 RNA, VGAM1429 RNA, VGAM1448 RNA, VGAM1611 RNA and VGAM1615 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59216] VGAM1060 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1060 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1060 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1060 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59217] VGAM1061 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1061 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1061 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1061 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59218] VGAM1123 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1123 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1123 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1123 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59219] VGAM1126 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1126 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1126 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1126 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59220] VGAM1429 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1429 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1429 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1429 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[59221] VGAM1448 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1448 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1448 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1448 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59222] VGAM1611 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1611 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1611 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1611 host target protein, herein schematically

represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59223] VGAM1615 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1615 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1615 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1615 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59224] It is appreciated that a function of VGR4264 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4264 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4264 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4264 gene: VGAM1060 host target protein, VGAM1061 host target protein, VGAM1123 host target protein, VGAM1126 host target protein, VGAM1429 host target protein, VGAM1448 host target protein, VGAM1611 host target protein and VGAM1615 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1060, VGAM1061, VGAM1123, VGAM1126, VGAM1429, VGAM1448, VGAM1611 and VGAM1615

[59225] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4265(VGR4265) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59226] VGR4265 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4265 gene was

detected is described hereinabove with reference to Figs. 6–15.

[59227] VGR4265 gene encodes VGR4265 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59228] VGR4265 precursor RNA folds spatially, forming VGR4265 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4265 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4265 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59229] VGR4265 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1616 precursor RNA, VGAM1619 precursor RNA, VGAM1621 precursor RNA, VGAM1680 precursor RNA, VGAM1681 precursor RNA, VGAM1747 precursor RNA, VGAM1749 precursor RNA and VGAM1781

precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59230] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1616 RNA, VGAM1619 RNA, VGAM1621 RNA, VGAM1680 RNA, VGAM1681 RNA, VGAM1747 RNA, VGAM1749 RNA and VGAM1781 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59231] VGAM1616 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1616 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1616 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1616 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59232] VGAM1619 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1619 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1619 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1619 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59233] VGAM1621 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1621 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1621 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1621 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59234] VGAM1680 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1680 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1680 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1680 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59235] VGAM1681 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1681 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1681 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1681 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59236] VGAM1747 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1747 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1747 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1747 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59237] VGAM1749 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1749 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1749 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1749 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59238] VGAM1781 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1781 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1781 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1781 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59239] It is appreciated that a function of VGR4265 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4265 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4265 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4265 gene: VGAM1616 host target protein, VGAM1619 host target protein, VGAM1621 host target protein, VGAM1680 host target protein, VGAM1681 host target protein, VGAM1747 host target protein, VGAM1749 host target protein and VGAM1781 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1616, VGAM1619, VGAM1621, VGAM1680, VGAM1681, VGAM1747, VGAM1749 and VGAM1781

[59240] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4266(VGR4266) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59241] VGR4266 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4266 gene was detected is described hereinabove with reference to Figs. 6–15.

[59242] VGR4266 gene encodes VGR4266 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59243] VGR4266 precursor RNA folds spatially, forming VGR4266 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4266 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4266 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59244] VGR4266 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1882 precursor RNA, VGAM2043 precursor RNA, VGAM2169 precursor RNA, VGAM2170 precursor RNA, VGAM2232 precursor RNA, VGAM2233 precursor RNA, VGAM2408 precursor RNA and VGAM3303 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59245] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1882 RNA, VGAM2043 RNA, VGAM2169 RNA, VGAM2170 RNA, VGAM2232 RNA, VGAM2233 RNA, VGAM2408 RNA and VGAM3303 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[59246] VGAM1882 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1882 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1882 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1882 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59247] VGAM2043 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2043 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2043 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2043 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59248] VGAM2169 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2169 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2169 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2169 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59249] VGAM2170 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2170 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2170 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM2170 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59250] VGAM2232 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2232 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2232 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2232 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59251] VGAM2233 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2233 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2233 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM2233 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59252] VGAM2408 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2408 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2408 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2408 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59253] VGAM3303 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3303 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3303 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3303 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59254] It is appreciated that a function of VGR4266 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4266 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4266 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4266 gene: VGAM1882 host target protein, VGAM2043 host target protein, VGAM2169 host target protein, VGAM2170 host target protein, VGAM2232 host target protein, VGAM2233 host target protein, VGAM2408 host target protein and VGAM3303 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM1882, VGAM2043, VGAM2169, VGAM2170, VGAM2232, VGAM2233, VGAM2408 and VGAM3303

[59255] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4267(VGR4267) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59256] VGR4267 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4267 gene was detected is described hereinabove with reference to Figs. 6-15.

[59257] VGR4267 gene encodes VGR4267 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59258] VGR4267 precursor RNA folds spatially, forming VGR4267 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4267 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4267 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59259] VGR4267 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3304 precursor RNA and VGAM3690 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59260] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3304 RNA and VGAM3690 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59261] VGAM3304 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3304 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3304 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3304 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59262] VGAM3690 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3690 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3690 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3690 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[59263] It is appreciated that a function of VGR4267 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4267 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4267 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4267 gene: VGAM3304 host target protein and VGAM3690 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3304 and VGAM3690

[59264] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4268(VGR4268) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[59265] VGR4268 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4268 gene was detected is described hereinabove with reference to Figs. 6–15.

[59266] VGR4268 gene encodes VGR4268 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59267] VGR4268 precursor RNA folds spatially, forming VGR4268 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4268 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4268 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59268] VGR4268 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM pre–

cursor RNAs, VGAM925 precursor RNA, VGAM927 precursor RNA and VGAM3237 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59269] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM925 RNA, VGAM927 RNA and VGAM3237 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59270] VGAM925 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM925 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM925 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM925 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59271] VGAM927 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM927 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM927 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM927 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59272] VGAM3237 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3237 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3237 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM3237 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59273] It is appreciated that a function of VGR4268 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4268 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4268 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4268 gene: VGAM925 host target protein, VGAM927 host target protein and VGAM3237 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM925, VGAM927 and VGAM3237

[59274] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4269(VGR4269) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59275] VGR4269 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4269 gene was detected is described hereinabove with reference to Figs. 6–15.

[59276] VGR4269 gene encodes VGR4269 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59277] VGR4269 precursor RNA folds spatially, forming VGR4269 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4269 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4269 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59278] VGR4269 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1835 precursor RNA, VGAM1836 precursor RNA, VGAM1840 precursor RNA, VGAM1841 precursor RNA, VGAM1842 precursor RNA, VGAM2700 precursor RNA and VGAM3343 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59279] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1835 RNA, VGAM1836 RNA, VGAM1840 RNA, VGAM1841 RNA, VGAM1842 RNA, VGAM2700 RNA and VGAM3343 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59280] VGAM1835 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1835 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1835 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1835 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59281] VGAM1836 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1836 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1836 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1836 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59282] VGAM1840 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1840 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1840 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1840 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59283] VGAM1841 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1841 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1841 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1841 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[59284] VGAM1842 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1842 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1842 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1842 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59285] VGAM2700 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2700 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2700 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2700 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59286] VGAM3343 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3343 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3343 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3343 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59287] It is appreciated that a function of VGR4269 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4269 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4269 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4269 gene: VGAM1835 host target protein, VGAM1836 host target protein, VGAM1840 host target protein, VGAM1841 host target protein, VGAM1842 host target protein, VGAM2700 host target protein and VGAM3343 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1835, VGAM1836, VGAM1840, VGAM1841, VGAM1842, VGAM2700 and VGAM3343

[59288] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4270(VGR4270) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59289] VGR4270 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4270 gene was detected is described hereinabove with reference to Figs.

6-15.

[59290] VGR4270 gene encodes VGR4270 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59291] VGR4270 precursor RNA folds spatially, forming VGR4270 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4270 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4270 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59292] VGR4270 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2324 precursor RNA, VGAM2325 precursor RNA and VGAM2326 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA

segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59293] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2324 RNA, VGAM2325 RNA and VGAM2326 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59294] VGAM2324 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2324 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2324 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2324 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59295] VGAM2325 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2325 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2325 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2325 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59296] VGAM2326 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2326 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2326 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2326 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59297] It is appreciated that a function of VGR4270 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4270 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4270 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4270 gene: VGAM2324 host target protein, VGAM2325 host target protein and VGAM2326 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2324, VGAM2325 and VGAM2326

[59298] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4271(VGR4271) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59299] VGR4271 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4271 gene was detected is described hereinabove with reference to Figs. 6–15.

[59300] VGR4271 gene encodes VGR4271 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59301] VGR4271 precursor RNA folds spatially, forming VGR4271 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4271 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4271 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59302] VGR4271 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1643 precursor RNA and VGAM1647

precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59303] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1643 RNA and VGAM1647 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59304] VGAM1643 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1643 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1643 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1643 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[59305] VGAM1647 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1647 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1647 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1647 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59306] It is appreciated that a function of VGR4271 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4271 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4271 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4271 gene: VGAM1643

host target protein and VGAM1647 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM1643 and VGAM1647

[59307] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4272(VGR4272) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59308] VGR4272 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4272 gene was detected is described hereinabove with reference to Figs. 6–15.

[59309] VGR4272 gene encodes VGR4272 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59310] VGR4272 precursor RNA folds spatially, forming VGR4272 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4272 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4272 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59311] VGR4272 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2394 precursor RNA and VGAM3816 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59312] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2394 RNA and VGAM3816 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respec-

tively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59313] VGAM2394 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2394 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2394 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2394 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59314] VGAM3816 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3816 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3816 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM3816 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [59315] It is appreciated that a function of VGR4272 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4272 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4272 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4272 gene: VGAM2394 host target protein and VGAM3816 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2394 and VGAM3816
- [59316] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4273(VGR4273) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59317] VGR4273 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4273 gene was detected is described hereinabove with reference to Figs. 6–15.

[59318] VGR4273 gene encodes VGR4273 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59319] VGR4273 precursor RNA folds spatially, forming VGR4273 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4273 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4273 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59320] VGR4273 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1997 precursor RNA, VGAM1998 precursor RNA, VGAM1999 precursor RNA, VGAM2000 precursor RNA, VGAM2001 precursor RNA, VGAM2099 precursor RNA, VGAM2101 precursor RNA and VGAM3357 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59321] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1997 RNA, VGAM1998 RNA, VGAM1999 RNA, VGAM2000 RNA, VGAM2001 RNA, VGAM2099 RNA, VGAM2101 RNA and VGAM3357 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59322] VGAM1997 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1997 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1997 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1997 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59323] VGAM1998 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1998 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1998 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1998 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[59324] VGAM1999 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1999 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1999 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1999 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59325] VGAM2000 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2000 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2000 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2000 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59326] VGAM2001 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2001 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2001 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2001 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59327] VGAM2099 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2099 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2099 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2099 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59328] VGAM2101 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2101 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2101 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2101 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59329] VGAM3357 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3357 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3357 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM3357 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59330] It is appreciated that a function of VGR4273 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4273 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4273 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4273 gene: VGAM1997 host target protein, VGAM1998 host target protein, VGAM1999 host target protein, VGAM2000 host target protein, VGAM2001 host target protein, VGAM2099 host target protein, VGAM2101 host target protein and VGAM3357 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1997, VGAM1998, VGAM1999,

VGAM2000, VGAM2001, VGAM2099, VGAM2101 and VGAM3357

[59331] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4274(VGR4274) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59332] VGR4274 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4274 gene was detected is described hereinabove with reference to Figs. 6–15.

[59333] VGR4274 gene encodes VGR4274 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59334] VGR4274 precursor RNA folds spatially, forming VGR4274 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4274 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4274 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59335] VGR4274 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM582 precursor RNA, VGAM583 precursor RNA, VGAM663 precursor RNA, VGAM664 precursor RNA, VGAM880 precursor RNA, VGAM882 precursor RNA, VGAM883 precursor RNA and VGAM891 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59336] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM582

RNA, VGAM583 RNA, VGAM663 RNA, VGAM664 RNA, VGAM880 RNA, VGAM882 RNA, VGAM883 RNA and VGAM891 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59337] VGAM582 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM582 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM582 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM582 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59338] VGAM583 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM583 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM583 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM583 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59339] VGAM663 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM663 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM663 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM663 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59340] VGAM664 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM664 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM664 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM664 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59341] VGAM880 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM880 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM880 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM880 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59342] VGAM882 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM882 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM882 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM882 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59343] VGAM883 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM883 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM883 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM883 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59344] VGAM891 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM891 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM891 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM891 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59345] It is appreciated that a function of VGR4274 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4274 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4274 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4274 gene: VGAM582 host target protein, VGAM583 host target protein, VGAM663 host target protein, VGAM664 host target protein,

VGAM880 host target protein, VGAM882 host target protein, VGAM883 host target protein and VGAM891 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM582, VGAM583, VGAM663, VGAM664, VGAM880, VGAM882, VGAM883 and VGAM891

[59346] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4275(VGR4275) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59347] VGR4275 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4275 gene was detected is described hereinabove with reference to Figs. 6–15.

[59348] VGR4275 gene encodes VGR4275 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[59349] VGR4275 precursor RNA folds spatially, forming VGR4275 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4275 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4275 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59350] VGR4275 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1172 precursor RNA, VGAM1173 precursor RNA, VGAM1174 precursor RNA, VGAM1377 precursor RNA, VGAM1378 precursor RNA, VGAM1555 precursor RNA, VGAM1908 precursor RNA and VGAM1910 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRE-

CURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59351] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1172 RNA, VGAM1173 RNA, VGAM1174 RNA, VGAM1377 RNA, VGAM1378 RNA, VGAM1555 RNA, VGAM1908 RNA and VGAM1910 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59352] VGAM1172 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1172 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1172 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1172 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59353] VGAM1173 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1173 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1173 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1173 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59354] VGAM1174 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1174 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1174 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM1174 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59355] VGAM1377 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1377 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1377 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1377 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59356] VGAM1378 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1378 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1378 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM1378 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59357] VGAM1555 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1555 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1555 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1555 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59358] VGAM1908 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1908 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1908 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1908 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59359] VGAM1910 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1910 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1910 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1910 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59360] It is appreciated that a function of VGR4275 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4275 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4275

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4275 gene: VGAM1172 host target protein, VGAM1173 host target protein, VGAM1174 host target protein, VGAM1377 host target protein, VGAM1378 host target protein, VGAM1555 host target protein, VGAM1908 host target protein and VGAM1910 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1172, VGAM1173, VGAM1174, VGAM1377, VGAM1378, VGAM1555, VGAM1908 and VGAM1910

[59361] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4276(VGR4276) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59362] VGR4276 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4276 gene was detected is described hereinabove with reference to Figs. 6–15.

[59363] VGR4276 gene encodes VGR4276 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59364] VGR4276 precursor RNA folds spatially, forming VGR4276 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4276 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4276 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59365] VGR4276 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1915 precursor RNA, VGAM1916 pre–

cursor RNA, VGAM2142 precursor RNA, VGAM2371 precursor RNA, VGAM2537 precursor RNA, VGAM2605 precursor RNA, VGAM2606 precursor RNA and VGAM2757 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59366] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1915 RNA, VGAM1916 RNA, VGAM2142 RNA, VGAM2371 RNA, VGAM2537 RNA, VGAM2605 RNA, VGAM2606 RNA and VGAM2757 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59367] VGAM1915 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1915 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1915 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1915 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59368] VGAM1916 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1916 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1916 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1916 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59369] VGAM2142 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM2142 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2142 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2142 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59370] VGAM2371 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2371 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2371 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2371 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59371] VGAM2537 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2537 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2537 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2537 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59372] VGAM2605 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2605 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2605 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2605 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59373] VGAM2606 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2606 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2606 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2606 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59374] VGAM2757 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2757 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2757 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2757 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[59375] It is appreciated that a function of VGR4276 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4276 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4276 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4276 gene: VGAM1915 host target protein, VGAM1916 host target protein, VGAM2142 host target protein, VGAM2371 host target protein, VGAM2537 host target protein, VGAM2605 host target protein, VGAM2606 host target protein and VGAM2757 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1915, VGAM1916, VGAM2142, VGAM2371, VGAM2537, VGAM2605, VGAM2606 and VGAM2757

[59376] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4277(VGR4277) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59377] VGR4277 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4277 gene was detected is described hereinabove with reference to Figs. 6–15.

[59378] VGR4277 gene encodes VGR4277 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59379] VGR4277 precursor RNA folds spatially, forming VGR4277 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4277 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4277 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59380] VGR4277 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2800 precursor RNA, VGAM2801 precursor RNA, VGAM2892 precursor RNA, VGAM3000 precursor RNA, VGAM3435 precursor RNA, VGAM3454 precursor RNA, VGAM3464 precursor RNA and VGAM3741 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59381] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2800 RNA, VGAM2801 RNA, VGAM2892 RNA, VGAM3000 RNA, VGAM3435 RNA, VGAM3454 RNA, VGAM3464 RNA and VGAM3741 RNA respectively, herein schematically repre-

sented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59382] VGAM2800 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2800 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2800 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2800 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59383] VGAM2801 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2801 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2801 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2801 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59384] VGAM2892 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2892 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2892 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2892 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59385] VGAM3000 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3000 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3000 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3000 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59386] VGAM3435 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3435 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3435 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3435 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59387] VGAM3454 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3454 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3454 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3454 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59388] VGAM3464 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3464 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3464 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3464 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59389] VGAM3741 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3741 host target RNA, herein schematically represented by VGAM8

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3741 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3741 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59390] It is appreciated that a function of VGR4277 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4277 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4277 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4277 gene: VGAM2800 host target protein, VGAM2801 host target protein, VGAM2892 host target protein, VGAM3000 host target protein, VGAM3435 host target protein, VGAM3454 host target protein, VGAM3464 host target protein and VGAM3741 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2800, VGAM2801, VGAM2892, VGAM3000, VGAM3435, VGAM3454, VGAM3464 and VGAM3741

[59391] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4278(VGR4278) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59392] VGR4278 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4278 gene was detected is described hereinabove with reference to Figs. 6–15.

[59393] VGR4278 gene encodes VGR4278 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59394] VGR4278 precursor RNA folds spatially, forming VGR4278

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4278 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4278 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59395] VGR4278 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3179 precursor RNA, VGAM3515 precursor RNA and VGAM3757 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59396] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3179

RNA, VGAM3515 RNA and VGAM3757 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59397] VGAM3179 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3179 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3179 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3179 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59398] VGAM3515 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3515 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3515 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3515 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59399] VGAM3757 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3757 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3757 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3757 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59400] It is appreciated that a function of VGR4278 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4278 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4278

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4278 gene: VGAM3179 host target protein, VGAM3515 host target protein and VGAM3757 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3179, VGAM3515 and VGAM3757

[59401] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4279(VGR4279) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59402] VGR4279 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4279 gene was detected is described hereinabove with reference to Figs. 6-15.

[59403] VGR4279 gene encodes VGR4279 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59404] VGR4279 precursor RNA folds spatially, forming VGR4279 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4279 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4279 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59405] VGR4279 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM928 precursor RNA and VGAM930 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59406] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM928 RNA and VGAM930 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59407] VGAM928 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM928 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM928 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM928 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59408] VGAM930 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM930 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM930 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM930 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59409] It is appreciated that a function of VGR4279 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4279 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4279 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4279 gene: VGAM928 host target protein and VGAM930 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM928 and VGAM930

[59410] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4280(VGR4280) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59411] VGR4280 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4280 gene was detected is described hereinabove with reference to Figs. 6–15.

[59412] VGR4280 gene encodes VGR4280 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59413] VGR4280 precursor RNA folds spatially, forming VGR4280 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4280 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4280 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59414] VGR4280 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2755 precursor RNA and VGAM2756 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59415] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2755 RNA and VGAM2756 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59416] VGAM2755 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2755 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2755 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2755 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59417] VGAM2756 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2756 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2756 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2756 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59418] It is appreciated that a function of VGR4280 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4280 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4280 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4280 gene: VGAM2755 host target protein and VGAM2756 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2755 and VGAM2756

[59419] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4281(VGR4281) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59420] VGR4281 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4281 gene was detected is described hereinabove with reference to Figs. 6–15.

[59421] VGR4281 gene encodes VGR4281 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59422] VGR4281 precursor RNA folds spatially, forming VGR4281 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4281 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4281 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59423] VGR4281 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1649 precursor RNA, VGAM1651 precursor RNA, VGAM1657 precursor RNA, VGAM1659 precursor RNA and VGAM1660 precursor RNA, herein

schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59424] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1649 RNA, VGAM1651 RNA, VGAM1657 RNA, VGAM1659 RNA and VGAM1660 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59425] VGAM1649 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1649 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1649 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1649 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59426] VGAM1651 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1651 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1651 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1651 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59427] VGAM1657 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1657 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1657 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM1657 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59428] VGAM1659 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1659 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1659 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1659 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59429] VGAM1660 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1660 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1660 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM1660 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59430] It is appreciated that a function of VGR4281 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4281 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4281 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4281 gene: VGAM1649 host target protein, VGAM1651 host target protein, VGAM1657 host target protein, VGAM1659 host target protein and VGAM1660 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1649, VGAM1651, VGAM1657, VGAM1659 and VGAM1660

[59431] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4282(VGR4282) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59432] VGR4282 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4282 gene was detected is described hereinabove with reference to Figs. 6–15.

[59433] VGR4282 gene encodes VGR4282 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59434] VGR4282 precursor RNA folds spatially, forming VGR4282 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4282 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4282 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59435] VGR4282 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2364 precursor RNA, VGAM2365 precursor RNA, VGAM2873 precursor RNA and VGAM3815 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59436] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2364 RNA, VGAM2365 RNA, VGAM2873 RNA and VGAM3815 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59437] VGAM2364 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2364 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2364 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2364 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59438] VGAM2365 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2365 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2365 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2365 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59439] VGAM2873 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2873 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2873 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2873 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59440] VGAM3815 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3815 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3815 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3815 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[59441] It is appreciated that a function of VGR4282 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4282 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4282 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4282 gene: VGAM2364 host target protein, VGAM2365 host target protein, VGAM2873 host target protein and VGAM3815 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2364, VGAM2365, VGAM2873 and VGAM3815

[59442] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4283(VGR4283) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59443] VGR4283 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4283 gene was detected is described hereinabove with reference to Figs. 6–15.

[59444] VGR4283 gene encodes VGR4283 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59445] VGR4283 precursor RNA folds spatially, forming VGR4283 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4283 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4283 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59446] VGR4283 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1254 precursor RNA, VGAM1255 precursor RNA, VGAM2019 precursor RNA, VGAM2195 precursor RNA, VGAM2196 precursor RNA, VGAM2267 precursor RNA, VGAM2407 precursor RNA and VGAM2959 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59447] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1254 RNA, VGAM1255 RNA, VGAM2019 RNA, VGAM2195 RNA, VGAM2196 RNA, VGAM2267 RNA, VGAM2407 RNA and VGAM2959 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59448] VGAM1254 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1254 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1254 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1254 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59449] VGAM1255 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1255 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1255 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1255 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[59450] VGAM2019 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2019 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2019 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2019 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59451] VGAM2195 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2195 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2195 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2195 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59452] VGAM2196 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2196 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2196 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2196 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59453] VGAM2267 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2267 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2267 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2267 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59454] VGAM2407 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2407 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2407 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2407 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59455] VGAM2959 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2959 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2959 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM2959 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59456] It is appreciated that a function of VGR4283 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4283 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4283 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4283 gene: VGAM1254 host target protein, VGAM1255 host target protein, VGAM2019 host target protein, VGAM2195 host target protein, VGAM2196 host target protein, VGAM2267 host target protein, VGAM2407 host target protein and VGAM2959 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1254, VGAM1255, VGAM2019,

VGAM2195, VGAM2196, VGAM2267, VGAM2407 and VGAM2959

[59457] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4284(VGR4284) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59458] VGR4284 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4284 gene was detected is described hereinabove with reference to Figs. 6–15.

[59459] VGR4284 gene encodes VGR4284 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59460] VGR4284 precursor RNA folds spatially, forming VGR4284 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4284 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4284 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59461] VGR4284 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3393 precursor RNA and VGAM3575 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59462] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3393 RNA and VGAM3575 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59463] VGAM3393 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3393 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3393 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3393 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59464] VGAM3575 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3575 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3575 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3575 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59465] It is appreciated that a function of VGR4284 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4284 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4284 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4284 gene: VGAM3393 host target protein and VGAM3575 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3393 and VGAM3575

[59466] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4285(VGR4285) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59467] VGR4285 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4285 gene was detected is described hereinabove with reference to Figs. 6–15.

[59468] VGR4285 gene encodes VGR4285 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59469] VGR4285 precursor RNA folds spatially, forming VGR4285 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4285 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4285 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59470] VGR4285 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1388 precursor RNA, VGAM1393 pre–

cursor RNA, VGAM2590 precursor RNA, VGAM3209 precursor RNA and VGAM3210 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59471] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1388 RNA, VGAM1393 RNA, VGAM2590 RNA, VGAM3209 RNA and VGAM3210 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59472] VGAM1388 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1388 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1388 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM1388 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59473] VGAM1393 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1393 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1393 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1393 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59474] VGAM2590 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2590 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2590 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2590 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59475] VGAM3209 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3209 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3209 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3209 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59476] VGAM3210 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3210 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3210 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3210 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59477] It is appreciated that a function of VGR4285 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4285 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4285 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4285 gene: VGAM1388 host target protein, VGAM1393 host target protein, VGAM2590 host target protein, VGAM3209 host target protein and VGAM3210 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1388, VGAM1393,

VGAM2590, VGAM3209 and VGAM3210

[59478] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4286(VGR4286) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59479] VGR4286 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4286 gene was detected is described hereinabove with reference to Figs. 6–15.

[59480] VGR4286 gene encodes VGR4286 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59481] VGR4286 precursor RNA folds spatially, forming VGR4286 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4286 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4286 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59482] VGR4286 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1624 precursor RNA, VGAM1625 precursor RNA, VGAM1627 precursor RNA, VGAM2353 precursor RNA and VGAM3314 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59483] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1624 RNA, VGAM1625 RNA, VGAM1627 RNA, VGAM2353 RNA and VGAM3314 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which

VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59484] VGAM1624 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1624 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1624 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1624 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59485] VGAM1625 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1625 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1625 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1625 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59486] VGAM1627 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1627 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1627 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1627 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59487] VGAM2353 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2353 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2353 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM2353 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59488] VGAM3314 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3314 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3314 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3314 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59489] It is appreciated that a function of VGR4286 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4286 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4286 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4286 gene: VGAM1624 host target protein, VGAM1625 host target protein, VGAM1627 host target protein, VGAM2353 host target protein and VGAM3314 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1624, VGAM1625, VGAM1627, VGAM2353 and VGAM3314

[59490] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4287(VGR4287) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59491] VGR4287 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4287 gene was detected is described hereinabove with reference to Figs. 6-15.

[59492] VGR4287 gene encodes VGR4287 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59493] VGR4287 precursor RNA folds spatially, forming VGR4287 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4287 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4287 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59494] VGR4287 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM413 precursor RNA, VGAM524 precursor RNA, VGAM525 precursor RNA, VGAM526 precursor RNA, VGAM599 precursor RNA, VGAM600 precursor RNA, VGAM879 precursor RNA and VGAM881 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRE-

CURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59495] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM413 RNA, VGAM524 RNA, VGAM525 RNA, VGAM526 RNA, VGAM599 RNA, VGAM600 RNA, VGAM879 RNA and VGAM881 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59496] VGAM413 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM413 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM413 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM413 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59497] VGAM524 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM524 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM524 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM524 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59498] VGAM525 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM525 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM525 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM525 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59499] VGAM526 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM526 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM526 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM526 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59500] VGAM599 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM599 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM599 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM599 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59501] VGAM600 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM600 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM600 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM600 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59502] VGAM879 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM879 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM879 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM879 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59503] VGAM881 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM881 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM881 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM881 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59504] It is appreciated that a function of VGR4287 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4287 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4287 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4287 gene: VGAM413 host target protein, VGAM524 host target protein, VGAM525 host target protein, VGAM526 host target protein, VGAM599 host target protein, VGAM600 host target protein, VGAM879 host target protein and VGAM881 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM413, VGAM524, VGAM525, VGAM526, VGAM599, VGAM600, VGAM879 and VGAM881

[59505] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4288(VGR4288) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[59506] VGR4288 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4288 gene was detected is described hereinabove with reference to Figs. 6–15.

[59507] VGR4288 gene encodes VGR4288 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59508] VGR4288 precursor RNA folds spatially, forming VGR4288 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4288 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4288 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59509] VGR4288 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM946 precursor RNA, VGAM1141 precursor RNA, VGAM1265 precursor RNA, VGAM1271 precursor RNA, VGAM1305 precursor RNA, VGAM1807 precursor RNA, VGAM1810 precursor RNA and VGAM1986 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59510] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM946 RNA, VGAM1141 RNA, VGAM1265 RNA, VGAM1271 RNA, VGAM1305 RNA, VGAM1807 RNA, VGAM1810 RNA and VGAM1986 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59511] VGAM946 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM946 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM946 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM946 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59512] VGAM1141 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1141 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1141 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1141 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59513] VGAM1265 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1265 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1265 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1265 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59514] VGAM1271 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1271 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1271 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1271 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59515] VGAM1305 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1305 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1305 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1305 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59516] VGAM1807 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1807 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1807 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1807 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[59517] VGAM1810 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1810 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1810 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1810 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59518] VGAM1986 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1986 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1986 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1986 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59519] It is appreciated that a function of VGR4288 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4288 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4288 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4288 gene: VGAM946 host target protein, VGAM1141 host target protein, VGAM1265 host target protein, VGAM1271 host target protein, VGAM1305 host target protein, VGAM1807 host target protein, VGAM1810 host target protein and VGAM1986 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM946, VGAM1141, VGAM1265, VGAM1271, VGAM1305, VGAM1807, VGAM1810 and VGAM1986

[59520] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4289(VGR4289) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59521] VGR4289 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4289 gene was detected is described hereinabove with reference to Figs. 6–15.

[59522] VGR4289 gene encodes VGR4289 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59523] VGR4289 precursor RNA folds spatially, forming VGR4289 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4289 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4289 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59524] VGR4289 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1987 precursor RNA, VGAM1988 precursor RNA, VGAM2105 precursor RNA, VGAM2106 precursor RNA, VGAM2201 precursor RNA, VGAM2231 precursor RNA, VGAM2278 precursor RNA and VGAM2279 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59525] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1987 RNA, VGAM1988 RNA, VGAM2105 RNA, VGAM2106 RNA, VGAM2201 RNA, VGAM2231 RNA, VGAM2278 RNA and VGAM2279 RNA respectively, herein schematically repre-

sented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59526] VGAM1987 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1987 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1987 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1987 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59527] VGAM1988 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1988 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1988 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1988 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59528] VGAM2105 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2105 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2105 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2105 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59529] VGAM2106 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2106 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2106 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2106 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59530] VGAM2201 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2201 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2201 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2201 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59531] VGAM2231 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2231 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2231 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2231 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59532] VGAM2278 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2278 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2278 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2278 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59533] VGAM2279 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2279 host target RNA, herein schematically represented by VGAM8

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2279 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2279 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59534] It is appreciated that a function of VGR4289 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4289 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4289 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4289 gene: VGAM1987 host target protein, VGAM1988 host target protein, VGAM2105 host target protein, VGAM2106 host target protein, VGAM2201 host target protein, VGAM2231 host target protein, VGAM2278 host target protein and VGAM2279 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1987, VGAM1988, VGAM2105, VGAM2106, VGAM2201, VGAM2231, VGAM2278 and VGAM2279

[59535] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4290(VGR4290) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59536] VGR4290 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4290 gene was detected is described hereinabove with reference to Figs. 6–15.

[59537] VGR4290 gene encodes VGR4290 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59538] VGR4290 precursor RNA folds spatially, forming VGR4290

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4290 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4290 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59539] VGR4290 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2280 precursor RNA, VGAM2367 precursor RNA, VGAM2375 precursor RNA, VGAM2409 precursor RNA, VGAM2413 precursor RNA, VGAM2414 precursor RNA, VGAM2509 precursor RNA and VGAM2510 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to

VGAM PRECURSOR RNA of Fig. 8.

[59540] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2280 RNA, VGAM2367 RNA, VGAM2375 RNA, VGAM2409 RNA, VGAM2413 RNA, VGAM2414 RNA, VGAM2509 RNA and VGAM2510 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59541] VGAM2280 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2280 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2280 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2280 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59542] VGAM2367 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2367 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2367 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2367 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59543] VGAM2375 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2375 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2375 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2375 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[59544] VGAM2409 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2409 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2409 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2409 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59545] VGAM2413 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2413 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2413 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2413 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59546] VGAM2414 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2414 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2414 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2414 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59547] VGAM2509 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2509 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2509 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM2509 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59548] VGAM2510 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2510 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2510 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2510 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59549] It is appreciated that a function of VGR4290 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4290 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4290 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4290 gene: VGAM2280 host target protein, VGAM2367 host target protein, VGAM2375 host target protein, VGAM2409 host target protein, VGAM2413 host target protein, VGAM2414 host target protein, VGAM2509 host target protein and VGAM2510 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2280, VGAM2367, VGAM2375, VGAM2409, VGAM2413, VGAM2414, VGAM2509 and VGAM2510

[59550] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4291(VGR4291) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59551] VGR4291 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4291 gene was detected is described hereinabove with reference to Figs. 6–15.

[59552] VGR4291 gene encodes VGR4291 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59553] VGR4291 precursor RNA folds spatially, forming VGR4291 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4291 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4291 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59554] VGR4291 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2579 precursor RNA, VGAM2611 precursor RNA, VGAM2616 precursor RNA, VGAM2625 precursor RNA, VGAM2626 precursor RNA, VGAM2627 pre–

cursor RNA, VGAM2658 precursor RNA and VGAM2659 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59555] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2579 RNA, VGAM2611 RNA, VGAM2616 RNA, VGAM2625 RNA, VGAM2626 RNA, VGAM2627 RNA, VGAM2658 RNA and VGAM2659 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59556] VGAM2579 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2579 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2579 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2579 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59557] VGAM2611 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2611 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2611 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2611 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59558] VGAM2616 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2616 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2616 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2616 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59559] VGAM2625 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2625 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2625 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2625 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59560] VGAM2626 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2626 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2626 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2626 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59561] VGAM2627 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2627 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2627 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2627 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59562] VGAM2658 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM2658 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2658 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2658 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59563] VGAM2659 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2659 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2659 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2659 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59564] It is appreciated that a function of VGR4291 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4291 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4291 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4291 gene: VGAM2579 host target protein, VGAM2611 host target protein, VGAM2616 host target protein, VGAM2625 host target protein, VGAM2626 host target protein, VGAM2627 host target protein, VGAM2658 host target protein and VGAM2659 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2579, VGAM2611, VGAM2616, VGAM2625, VGAM2626, VGAM2627, VGAM2658 and VGAM2659

[59565] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4292(VGR4292) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59566] VGR4292 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4292 gene was detected is described hereinabove with reference to Figs. 6–15.

[59567] VGR4292 gene encodes VGR4292 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59568] VGR4292 precursor RNA folds spatially, forming VGR4292 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4292 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4292 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[59569] VGR4292 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2660 precursor RNA, VGAM2701 precursor RNA, VGAM2735 precursor RNA, VGAM2758 precursor RNA, VGAM2786 precursor RNA, VGAM2787 precursor RNA, VGAM2788 precursor RNA and VGAM2820 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59570] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2660 RNA, VGAM2701 RNA, VGAM2735 RNA, VGAM2758 RNA, VGAM2786 RNA, VGAM2787 RNA, VGAM2788 RNA and VGAM2820 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59571] VGAM2660 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2660 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2660 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2660 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59572] VGAM2701 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2701 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2701 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM2701 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59573] VGAM2735 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2735 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2735 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2735 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59574] VGAM2758 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2758 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2758 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM2758 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59575] VGAM2786 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2786 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2786 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2786 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59576] VGAM2787 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2787 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2787 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2787 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59577] VGAM2788 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2788 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2788 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2788 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59578] VGAM2820 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2820 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2820 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2820 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59579] It is appreciated that a function of VGR4292 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4292 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4292 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4292 gene: VGAM2660 host target protein, VGAM2701 host target protein, VGAM2735 host target protein, VGAM2758 host target protein, VGAM2786 host target protein, VGAM2787 host target protein, VGAM2788 host target protein and VGAM2820 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM2660, VGAM2701, VGAM2735, VGAM2758, VGAM2786, VGAM2787, VGAM2788 and VGAM2820

[59580] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4293(VGR4293) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59581] VGR4293 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4293 gene was detected is described hereinabove with reference to Figs. 6–15.

[59582] VGR4293 gene encodes VGR4293 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59583] VGR4293 precursor RNA folds spatially, forming VGR4293 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4293 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4293 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59584] VGR4293 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2821 precursor RNA, VGAM2845 precursor RNA, VGAM2868 precursor RNA, VGAM2876 precursor RNA, VGAM2886 precursor RNA, VGAM2887 precursor RNA, VGAM2900 precursor RNA and VGAM2906 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59585] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2821 RNA, VGAM2845 RNA, VGAM2868 RNA, VGAM2876 RNA, VGAM2886 RNA, VGAM2887 RNA, VGAM2900 RNA and VGAM2906 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59586] VGAM2821 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2821 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2821 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2821 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59587] VGAM2845 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2845 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2845 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2845 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59588] VGAM2868 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2868 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2868 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2868 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59589] VGAM2876 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2876 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2876 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2876 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59590] VGAM2886 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2886 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2886 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2886 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59591] VGAM2887 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2887 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2887 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2887 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59592] VGAM2900 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2900 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2900 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2900 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[59593] VGAM2906 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2906 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2906 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2906 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59594] It is appreciated that a function of VGR4293 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4293 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4293 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4293 gene: VGAM2821

host target protein, VGAM2845 host target protein, VGAM2868 host target protein, VGAM2876 host target protein, VGAM2886 host target protein, VGAM2887 host target protein, VGAM2900 host target protein and VGAM2906 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2821, VGAM2845, VGAM2868, VGAM2876, VGAM2886, VGAM2887, VGAM2900 and VGAM2906

[59595] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4294(VGR4294) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59596] VGR4294 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4294 gene was detected is described hereinabove with reference to Figs.

6-15.

[59597] VGR4294 gene encodes VGR4294 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59598] VGR4294 precursor RNA folds spatially, forming VGR4294 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4294 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4294 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59599] VGR4294 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2929 precursor RNA, VGAM2954 precursor RNA, VGAM2955 precursor RNA, VGAM2956 precursor RNA, VGAM2998 precursor RNA, VGAM2999 precursor RNA, VGAM3001 precursor RNA and VGAM3071 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59600] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2929 RNA, VGAM2954 RNA, VGAM2955 RNA, VGAM2956 RNA, VGAM2998 RNA, VGAM2999 RNA, VGAM3001 RNA and VGAM3071 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59601] VGAM2929 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2929 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2929 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2929 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59602] VGAM2954 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2954 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2954 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2954 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59603] VGAM2955 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2955 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2955 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2955 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59604] VGAM2956 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2956 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2956 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2956 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59605] VGAM2998 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2998 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2998 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2998 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59606] VGAM2999 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2999 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2999 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2999 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59607] VGAM3001 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3001 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3001 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3001 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59608] VGAM3071 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3071 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3071 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3071 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59609] It is appreciated that a function of VGR4294 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4294 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4294 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4294 gene: VGAM2929 host target protein, VGAM2954 host target protein, VGAM2955 host target protein, VGAM2956 host target protein, VGAM2998 host target protein, VGAM2999 host target protein, VGAM3001 host target protein and VGAM3071 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2929, VGAM2954, VGAM2955, VGAM2956, VGAM2998, VGAM2999, VGAM3001 and VGAM3071

[59610] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4295(VGR4295) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59611] VGR4295 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4295 gene was detected is described hereinabove with reference to Figs. 6–15.

[59612] VGR4295 gene encodes VGR4295 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59613] VGR4295 precursor RNA folds spatially, forming VGR4295 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4295 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4295 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59614] VGR4295 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3081 precursor RNA, VGAM3143 precursor RNA, VGAM3144 precursor RNA, VGAM3152 precursor RNA, VGAM3161 precursor RNA, VGAM3195 precursor RNA, VGAM3203 precursor RNA and VGAM3228 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59615] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3081 RNA, VGAM3143 RNA, VGAM3144 RNA, VGAM3152 RNA, VGAM3161 RNA, VGAM3195 RNA, VGAM3203 RNA and VGAM3228 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59616] VGAM3081 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3081 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3081 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3081 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59617] VGAM3143 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3143 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3143 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3143 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[59618] VGAM3144 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3144 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3144 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3144 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59619] VGAM3152 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3152 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3152 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3152 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59620] VGAM3161 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3161 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3161 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3161 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59621] VGAM3195 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3195 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3195 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM3195 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59622] VGAM3203 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3203 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3203 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3203 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59623] VGAM3228 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3228 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3228 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM3228 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59624] It is appreciated that a function of VGR4295 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4295 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4295 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4295 gene: VGAM3081 host target protein, VGAM3143 host target protein, VGAM3144 host target protein, VGAM3152 host target protein, VGAM3161 host target protein, VGAM3195 host target protein, VGAM3203 host target protein and VGAM3228 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3081, VGAM3143, VGAM3144,

VGAM3152, VGAM3161, VGAM3195, VGAM3203 and VGAM3228

[59625] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4296(VGR4296) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59626] VGR4296 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4296 gene was detected is described hereinabove with reference to Figs. 6–15.

[59627] VGR4296 gene encodes VGR4296 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59628] VGR4296 precursor RNA folds spatially, forming VGR4296 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4296 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4296 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59629] VGR4296 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3239 precursor RNA, VGAM3240 precursor RNA, VGAM3261 precursor RNA, VGAM3269 precursor RNA, VGAM3275 precursor RNA, VGAM3286 precursor RNA, VGAM3307 precursor RNA and VGAM3308 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59630] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3239

RNA, VGAM3240 RNA, VGAM3261 RNA, VGAM3269 RNA, VGAM3275 RNA, VGAM3286 RNA, VGAM3307 RNA and VGAM3308 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59631] VGAM3239 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3239 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3239 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3239 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59632] VGAM3240 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3240 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3240 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3240 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59633] VGAM3261 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3261 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3261 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3261 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59634] VGAM3269 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3269 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3269 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3269 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59635] VGAM3275 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3275 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3275 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3275 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59636] VGAM3286 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM3286 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3286 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3286 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59637] VGAM3307 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3307 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3307 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3307 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59638] VGAM3308 RNA, herein schematically represented by

VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3308 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3308 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3308 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59639] It is appreciated that a function of VGR4296 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4296 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4296 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4296 gene: VGAM3239 host target protein, VGAM3240 host target protein, VGAM3261 host target protein, VGAM3269 host target

protein, VGAM3275 host target protein, VGAM3286 host target protein, VGAM3307 host target protein and VGAM3308 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3239, VGAM3240, VGAM3261, VGAM3269, VGAM3275, VGAM3286, VGAM3307 and VGAM3308

[59640] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4297(VGR4297) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59641] VGR4297 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4297 gene was detected is described hereinabove with reference to Figs. 6-15.

[59642] VGR4297 gene encodes VGR4297 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59643] VGR4297 precursor RNA folds spatially, forming VGR4297 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4297 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4297 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59644] VGR4297 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3372 precursor RNA, VGAM3373 precursor RNA, VGAM3396 precursor RNA, VGAM3484 precursor RNA, VGAM3495 precursor RNA, VGAM3496 precursor RNA, VGAM3519 precursor RNA and VGAM3526 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59645] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3372 RNA, VGAM3373 RNA, VGAM3396 RNA, VGAM3484 RNA, VGAM3495 RNA, VGAM3496 RNA, VGAM3519 RNA and VGAM3526 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59646] VGAM3372 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3372 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3372 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM3372 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59647] VGAM3373 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3373 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3373 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3373 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59648] VGAM3396 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3396 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3396 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM3396 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59649] VGAM3484 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3484 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3484 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3484 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59650] VGAM3495 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3495 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3495 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3495 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59651] VGAM3496 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3496 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3496 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3496 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59652] VGAM3519 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3519 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3519 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3519 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59653] VGAM3526 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3526 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3526 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3526 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59654] It is appreciated that a function of VGR4297 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4297 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4297 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4297 gene: VGAM3372 host target protein, VGAM3373 host target protein, VGAM3396 host target protein, VGAM3484 host target protein, VGAM3495 host target protein, VGAM3496 host target protein, VGAM3519 host target protein and VGAM3526 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3372, VGAM3373, VGAM3396, VGAM3484, VGAM3495, VGAM3496, VGAM3519 and VGAM3526

[59655] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4298(VGR4298) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[59656] VGR4298 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4298 gene was detected is described hereinabove with reference to Figs. 6–15.

[59657] VGR4298 gene encodes VGR4298 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59658] VGR4298 precursor RNA folds spatially, forming VGR4298 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4298 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4298 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59659] VGR4298 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM3585 precursor RNA, VGAM3604 precursor RNA, VGAM3646 precursor RNA, VGAM3659 precursor RNA, VGAM3712 precursor RNA, VGAM3717 precursor RNA, VGAM3745 precursor RNA and VGAM3749 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59660] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3585 RNA, VGAM3604 RNA, VGAM3646 RNA, VGAM3659 RNA, VGAM3712 RNA, VGAM3717 RNA, VGAM3745 RNA and VGAM3749 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59661] VGAM3585 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM3585 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3585 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3585 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59662] VGAM3604 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3604 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3604 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3604 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59663] VGAM3646 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3646 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3646 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3646 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59664] VGAM3659 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3659 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3659 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3659 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59665] VGAM3712 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3712 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3712 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3712 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59666] VGAM3717 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3717 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3717 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3717 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[59667] VGAM3745 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3745 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3745 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3745 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59668] VGAM3749 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3749 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3749 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3749 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59669] It is appreciated that a function of VGR4298 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4298 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4298 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4298 gene: VGAM3585 host target protein, VGAM3604 host target protein, VGAM3646 host target protein, VGAM3659 host target protein, VGAM3712 host target protein, VGAM3717 host target protein, VGAM3745 host target protein and VGAM3749 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3585, VGAM3604, VGAM3646, VGAM3659, VGAM3712, VGAM3717, VGAM3745 and VGAM3749

[59670] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4299(VGR4299) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59671] VGR4299 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4299 gene was detected is described hereinabove with reference to Figs. 6–15.

[59672] VGR4299 gene encodes VGR4299 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59673] VGR4299 precursor RNA folds spatially, forming VGR4299 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4299 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4299 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59674] VGR4299 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM3750 precursor RNA, VGAM3768 precursor RNA, VGAM3774 precursor RNA, VGAM3797 precursor RNA and VGAM3810 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59675] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3750 RNA, VGAM3768 RNA, VGAM3774 RNA, VGAM3797 RNA and VGAM3810 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59676] VGAM3750 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3750 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3750 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3750 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59677] VGAM3768 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3768 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3768 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3768 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[59678] VGAM3774 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3774 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3774 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3774 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59679] VGAM3797 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3797 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3797 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3797 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59680] VGAM3810 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3810 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3810 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3810 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59681] It is appreciated that a function of VGR4299 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4299 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4299 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4299 gene: VGAM3750 host target protein, VGAM3768 host target protein, VGAM3774 host target protein, VGAM3797 host target protein and VGAM3810 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3750, VGAM3768, VGAM3774, VGAM3797 and VGAM3810

[59682] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4300(VGR4300) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59683] VGR4300 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4300 gene was detected is described hereinabove with reference to Figs. 6-15.

[59684] VGR4300 gene encodes VGR4300 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59685] VGR4300 precursor RNA folds spatially, forming VGR4300 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4300 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4300 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59686] VGR4300 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2418 precursor RNA, VGAM2419 precursor RNA, VGAM3305 precursor RNA and VGAM3306 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig.

8.

[59687] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2418 RNA, VGAM2419 RNA, VGAM3305 RNA and VGAM3306 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59688] VGAM2418 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2418 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2418 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2418 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59689] VGAM2419 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2419 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2419 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2419 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59690] VGAM3305 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3305 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3305 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3305 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59691] VGAM3306 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3306 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3306 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3306 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59692] It is appreciated that a function of VGR4300 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4300 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4300 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4300 gene: VGAM2418 host target protein, VGAM2419 host target protein, VGAM3305 host target protein and VGAM3306 host target

protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2418, VGAM2419, VGAM3305 and VGAM3306

[59693] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4301(VGR4301) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59694] VGR4301 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4301 gene was detected is described hereinabove with reference to Figs. 6–15.

[59695] VGR4301 gene encodes VGR4301 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59696] VGR4301 precursor RNA folds spatially, forming VGR4301 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4301 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4301 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59697] VGR4301 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2680 precursor RNA, VGAM2681 precursor RNA and VGAM3121 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59698] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2680 RNA, VGAM2681 RNA and VGAM3121 RNA respectively,

herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59699] VGAM2680 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2680 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2680 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2680 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59700] VGAM2681 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2681 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2681 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM2681 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59701] VGAM3121 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3121 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3121 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3121 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59702] It is appreciated that a function of VGR4301 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4301 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4301 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4301 gene: VGAM2680 host target protein, VGAM2681 host target protein and VGAM3121 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2680, VGAM2681 and VGAM3121

[59703] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4302(VGR4302) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59704] VGR4302 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4302 gene was detected is described hereinabove with reference to Figs. 6-15.

[59705] VGR4302 gene encodes VGR4302 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59706] VGR4302 precursor RNA folds spatially, forming VGR4302 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4302 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4302 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59707] VGR4302 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM727 precursor RNA, VGAM728 precursor RNA, VGAM730 precursor RNA, VGAM731 precursor RNA and VGAM732 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to

VGAM PRECURSOR RNA of Fig. 8.

[59708] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM727 RNA, VGAM728 RNA, VGAM730 RNA, VGAM731 RNA and VGAM732 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59709] VGAM727 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM727 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM727 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM727 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59710] VGAM728 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM728 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM728 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM728 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59711] VGAM730 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM730 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM730 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM730 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59712] VGAM731 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM731 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM731 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM731 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59713] VGAM732 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM732 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM732 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM732 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59714] It is appreciated that a function of VGR4302 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4302 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4302 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4302 gene: VGAM727 host target protein, VGAM728 host target protein, VGAM730 host target protein, VGAM731 host target protein and VGAM732 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM727, VGAM728, VGAM730, VGAM731 and VGAM732

[59715] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4303(VGR4303) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59716] VGR4303 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4303 gene was detected is described hereinabove with reference to Figs. 6–15.

[59717] VGR4303 gene encodes VGR4303 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59718] VGR4303 precursor RNA folds spatially, forming VGR4303 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4303 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4303 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59719] VGR4303 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1297 precursor RNA and VGAM3524 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59720] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1297 RNA and VGAM3524 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59721] VGAM1297 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1297 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1297 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM1297 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59722] VGAM3524 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3524 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3524 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3524 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59723] It is appreciated that a function of VGR4303 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4303 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4303 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4303 gene: VGAM1297 host target protein and VGAM3524 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1297 and VGAM3524

[59724] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4304(VGR4304) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59725] VGR4304 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4304 gene was detected is described hereinabove with reference to Figs. 6–15.

[59726] VGR4304 gene encodes VGR4304 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[59727] VGR4304 precursor RNA folds spatially, forming VGR4304 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4304 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4304 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59728] VGR4304 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1582 precursor RNA, VGAM1584 precursor RNA, VGAM1587 precursor RNA, VGAM2053 precursor RNA, VGAM2054 precursor RNA and VGAM2994 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment,

corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59729] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1582 RNA, VGAM1584 RNA, VGAM1587 RNA, VGAM2053 RNA, VGAM2054 RNA and VGAM2994 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59730] VGAM1582 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1582 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1582 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1582 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59731] VGAM1584 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1584 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1584 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1584 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59732] VGAM1587 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1587 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1587 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1587 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59733] VGAM2053 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2053 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2053 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2053 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59734] VGAM2054 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2054 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2054 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2054 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[59735] VGAM2994 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2994 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2994 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2994 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59736] It is appreciated that a function of VGR4304 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4304 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4304 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4304 gene: VGAM1582

host target protein, VGAM1584 host target protein, VGAM1587 host target protein, VGAM2053 host target protein, VGAM2054 host target protein and VGAM2994 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1582, VGAM1584, VGAM1587, VGAM2053, VGAM2054 and VGAM2994

[59737] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4305(VGR4305) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59738] VGR4305 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4305 gene was detected is described hereinabove with reference to Figs. 6-15.

[59739] VGR4305 gene encodes VGR4305 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59740] VGR4305 precursor RNA folds spatially, forming VGR4305 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4305 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4305 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59741] VGR4305 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1852 precursor RNA, VGAM1853 precursor RNA, VGAM1857 precursor RNA, VGAM2918 precursor RNA, VGAM2919 precursor RNA and VGAM3260 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM

precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59742] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1852 RNA, VGAM1853 RNA, VGAM1857 RNA, VGAM2918 RNA, VGAM2919 RNA and VGAM3260 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59743] VGAM1852 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1852 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1852 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1852 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59744] VGAM1853 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1853 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1853 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1853 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59745] VGAM1857 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1857 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1857 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1857 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[59746] VGAM2918 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2918 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2918 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2918 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59747] VGAM2919 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2919 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2919 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2919 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59748] VGAM3260 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3260 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3260 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3260 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59749] It is appreciated that a function of VGR4305 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4305 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4305 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4305 gene: VGAM1852 host target protein, VGAM1853 host target protein, VGAM1857 host target protein, VGAM2918 host target protein, VGAM2919 host target protein and VGAM3260 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1852, VGAM1853, VGAM1857, VGAM2918, VGAM2919 and VGAM3260

[59750] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4306(VGR4306) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59751] VGR4306 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4306 gene was detected is described hereinabove with reference to Figs. 6-15.

[59752] VGR4306 gene encodes VGR4306 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59753] VGR4306 precursor RNA folds spatially, forming VGR4306 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4306 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4306 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59754] VGR4306 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3211 precursor RNA and VGAM3212 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59755] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3211 RNA and VGAM3212 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59756] VGAM3211 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3211 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3211 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3211 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59757] VGAM3212 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3212 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3212 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3212 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59758] It is appreciated that a function of VGR4306 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4306 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4306 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4306 gene: VGAM3211 host target protein and VGAM3212 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3211 and VGAM3212

[59759] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4307(VGR4307) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59760] VGR4307 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4307 gene was detected is described hereinabove with reference to Figs. 6–15.

[59761] VGR4307 gene encodes VGR4307 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59762] VGR4307 precursor RNA folds spatially, forming VGR4307 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4307 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4307 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59763] VGR4307 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3295 precursor RNA and VGAM3296 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59764] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3295 RNA and VGAM3296 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59765] VGAM3295 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3295 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3295 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3295 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59766] VGAM3296 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3296 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3296 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3296 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59767] It is appreciated that a function of VGR4307 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4307 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4307 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4307 gene: VGAM3295 host target protein and VGAM3296 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3295 and VGAM3296

[59768] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4308(VGR4308) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59769] VGR4308 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4308 gene was detected is described hereinabove with reference to Figs. 6–15.

[59770] VGR4308 gene encodes VGR4308 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59771] VGR4308 precursor RNA folds spatially, forming VGR4308 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4308 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4308 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59772] VGR4308 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2296 precursor RNA, VGAM3535 precursor RNA and VGAM3767 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2

PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59773] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2296 RNA, VGAM3535 RNA and VGAM3767 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59774] VGAM2296 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2296 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2296 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2296 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59775] VGAM3535 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3535 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3535 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3535 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59776] VGAM3767 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3767 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3767 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3767 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[59777] It is appreciated that a function of VGR4308 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4308 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4308 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4308 gene: VGAM2296 host target protein, VGAM3535 host target protein and VGAM3767 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2296, VGAM3535 and VGAM3767

[59778] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4309(VGR4309) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[59779] VGR4309 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4309 gene was detected is described hereinabove with reference to Figs. 6–15.

[59780] VGR4309 gene encodes VGR4309 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59781] VGR4309 precursor RNA folds spatially, forming VGR4309 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4309 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4309 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59782] VGR4309 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1237 precursor RNA and VGAM3525 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59783] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1237 RNA and VGAM3525 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59784] VGAM1237 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1237 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1237 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM1237 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59785] VGAM3525 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3525 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3525 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3525 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59786] It is appreciated that a function of VGR4309 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4309 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4309 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4309 gene: VGAM1237 host target protein and VGAM3525 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM1237 and VGAM3525

[59787] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4310(VGR4310) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59788] VGR4310 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4310 gene was detected is described hereinabove with reference to Figs. 6-15.

[59789] VGR4310 gene encodes VGR4310 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59790] VGR4310 precursor RNA folds spatially, forming VGR4310 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4310 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4310 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59791] VGR4310 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2937 precursor RNA and VGAM3356 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59792] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2937

RNA and VGAM3356 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59793] VGAM2937 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2937 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2937 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2937 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59794] VGAM3356 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3356 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3356 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3356 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [59795] It is appreciated that a function of VGR4310 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4310 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4310 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4310 gene: VGAM2937 host target protein and VGAM3356 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2937 and VGAM3356
- [59796] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4311(VGR4311) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59797] VGR4311 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4311 gene was detected is described hereinabove with reference to Figs. 6–15.

[59798] VGR4311 gene encodes VGR4311 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59799] VGR4311 precursor RNA folds spatially, forming VGR4311 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4311 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4311 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[59800] VGR4311 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2388 precursor RNA, VGAM2389 precursor RNA and VGAM2390 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59801] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2388 RNA, VGAM2389 RNA and VGAM2390 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59802] VGAM2388 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2388 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2388 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2388 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59803] VGAM2389 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2389 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2389 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2389 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59804] VGAM2390 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2390 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2390 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2390 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59805] It is appreciated that a function of VGR4311 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4311 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4311 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4311 gene: VGAM2388 host target protein, VGAM2389 host target protein and VGAM2390 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM2388, VGAM2389 and VGAM2390

[59806] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4312(VGR4312) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59807] VGR4312 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4312 gene was detected is described hereinabove with reference to Figs. 6–15.

[59808] VGR4312 gene encodes VGR4312 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59809] VGR4312 precursor RNA folds spatially, forming VGR4312 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4312 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4312 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59810] VGR4312 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2580 precursor RNA and VGAM3697 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59811] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2580 RNA and VGAM3697 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59812] VGAM2580 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2580 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2580 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2580 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59813] VGAM3697 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3697 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3697 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3697 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59814] It is appreciated that a function of VGR4312 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4312 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4312 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4312 gene: VGAM2580 host target protein and VGAM3697 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2580 and VGAM3697

[59815] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4313(VGR4313) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59816] VGR4313 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4313 gene was detected is described hereinabove with reference to Figs. 6–15.

[59817] VGR4313 gene encodes VGR4313 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59818] VGR4313 precursor RNA folds spatially, forming VGR4313 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4313 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4313 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59819] VGR4313 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1930 precursor RNA, VGAM1932 precursor RNA, VGAM1933 precursor RNA and VGAM1934

precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59820] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1930 RNA, VGAM1932 RNA, VGAM1933 RNA and VGAM1934 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59821] VGAM1930 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1930 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1930 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM1930 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59822] VGAM1932 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1932 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1932 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1932 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59823] VGAM1933 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1933 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1933 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM1933 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59824] VGAM1934 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1934 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1934 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1934 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59825] It is appreciated that a function of VGR4313 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4313 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4313 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4313 gene: VGAM1930 host target protein, VGAM1932 host target protein, VGAM1933 host target protein and VGAM1934 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1930, VGAM1932, VGAM1933 and VGAM1934

[59826] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4314(VGR4314) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59827] VGR4314 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4314 gene was detected is described hereinabove with reference to Figs. 6-15.

- [59828] VGR4314 gene encodes VGR4314 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.
- [59829] VGR4314 precursor RNA folds spatially, forming VGR4314 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4314 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4314 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.
- [59830] VGR4314 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM468 precursor RNA, VGAM469 precursor RNA, VGAM470 precursor RNA, VGAM472 precursor RNA and VGAM3683 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59831] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM468 RNA, VGAM469 RNA, VGAM470 RNA, VGAM472 RNA and VGAM3683 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59832] VGAM468 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM468 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM468 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM468 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59833] VGAM469 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM469 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM469 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM469 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59834] VGAM470 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM470 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM470 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM470 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59835] VGAM472 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM472 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM472 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM472 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59836] VGAM3683 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3683 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3683 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3683 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[59837] It is appreciated that a function of VGR4314 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4314 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4314 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4314 gene: VGAM468 host target protein, VGAM469 host target protein, VGAM470 host target protein, VGAM472 host target protein and VGAM3683 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM468, VGAM469, VGAM470, VGAM472 and VGAM3683

[59838] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4315(VGR4315) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59839] VGR4315 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4315 gene was detected is described hereinabove with reference to Figs. 6–15.

[59840] VGR4315 gene encodes VGR4315 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59841] VGR4315 precursor RNA folds spatially, forming VGR4315 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4315 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4315 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59842] VGR4315 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2003 precursor RNA and VGAM2004 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59843] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2003 RNA and VGAM2004 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59844] VGAM2003 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2003 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2003 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2003 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59845] VGAM2004 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2004 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2004 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2004 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59846] It is appreciated that a function of VGR4315 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4315 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4315

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4315 gene: VGAM2003 host target protein and VGAM2004 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2003 and VGAM2004

[59847] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4316(VGR4316) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59848] VGR4316 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4316 gene was detected is described hereinabove with reference to Figs. 6-15.

[59849] VGR4316 gene encodes VGR4316 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59850] VGR4316 precursor RNA folds spatially, forming VGR4316 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4316 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4316 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59851] VGR4316 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3477 precursor RNA and VGAM3478 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59852] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3477 RNA and VGAM3478 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59853] VGAM3477 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3477 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3477 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3477 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59854] VGAM3478 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3478 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3478 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3478 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59855] It is appreciated that a function of VGR4316 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4316 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4316 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4316 gene: VGAM3477 host target protein and VGAM3478 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3477 and VGAM3478

[59856] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4317(VGR4317) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59857] VGR4317 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4317 gene was detected is described hereinabove with reference to Figs. 6–15.

[59858] VGR4317 gene encodes VGR4317 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59859] VGR4317 precursor RNA folds spatially, forming VGR4317 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4317 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4317 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59860] VGR4317 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2275 precursor RNA, VGAM2277 precursor RNA and VGAM3060 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59861] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2275 RNA, VGAM2277 RNA and VGAM3060 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59862] VGAM2275 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2275 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2275 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2275 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59863] VGAM2277 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2277 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2277 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2277 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59864] VGAM3060 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM3060 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3060 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3060 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59865] It is appreciated that a function of VGR4317 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4317 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4317 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4317 gene: VGAM2275 host target protein, VGAM2277 host target protein and VGAM3060 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through

VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2275, VGAM2277 and VGAM3060

[59866] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4318(VGR4318) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59867] VGR4318 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4318 gene was detected is described hereinabove with reference to Figs. 6–15.

[59868] VGR4318 gene encodes VGR4318 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59869] VGR4318 precursor RNA folds spatially, forming VGR4318 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4318 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4318 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59870] VGR4318 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM16 precursor RNA, VGAM17 precursor RNA, VGAM21 precursor RNA, VGAM22 precursor RNA, VGAM27 precursor RNA, VGAM32 precursor RNA and VGAM36 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59871] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM16

RNA, VGAM17 RNA, VGAM21 RNA, VGAM22 RNA, VGAM27 RNA, VGAM32 RNA and VGAM36 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59872] VGAM16 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM16 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM16 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM16 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59873] VGAM17 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM17 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM17 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM17 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59874] VGAM21 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM21 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM21 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM21 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59875] VGAM22 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM22 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM22 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM22 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59876] VGAM27 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM27 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM27 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM27 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59877] VGAM32 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM32 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM32 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM32 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59878] VGAM36 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM36 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM36 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM36 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59879] It is appreciated that a function of VGR4318 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4318 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4318 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4318 gene: VGAM16 host target protein, VGAM17 host target protein, VGAM21 host target protein, VGAM22 host target protein, VGAM27 host target protein, VGAM32 host target protein and VGAM36 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM16, VGAM17, VGAM21, VGAM22, VGAM27, VGAM32 and VGAM36

[59880] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4319(VGR4319) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[59881] VGR4319 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4319 gene was detected is described hereinabove with reference to Figs. 6–15.

[59882] VGR4319 gene encodes VGR4319 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59883] VGR4319 precursor RNA folds spatially, forming VGR4319 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4319 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4319 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59884] VGR4319 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM41 precursor RNA, VGAM43 precursor RNA, VGAM45 precursor RNA, VGAM46 precursor RNA, VGAM48 precursor RNA, VGAM51 precursor RNA, VGAM53 precursor RNA and VGAM55 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59885] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM41 RNA, VGAM43 RNA, VGAM45 RNA, VGAM46 RNA, VGAM48 RNA, VGAM51 RNA, VGAM53 RNA and VGAM55 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59886] VGAM41 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM41 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM41 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM41 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59887] VGAM43 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM43 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM43 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM43 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59888] VGAM45 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM45 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM45 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM45 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59889] VGAM46 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM46 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM46 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM46 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[59890] VGAM48 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM48 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM48 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM48 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59891] VGAM51 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM51 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM51 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM51 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59892] VGAM53 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM53 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM53 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM53 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59893] VGAM55 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM55 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM55 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM55 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59894] It is appreciated that a function of VGR4319 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4319 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4319 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4319 gene: VGAM41 host target protein, VGAM43 host target protein, VGAM45 host target protein, VGAM46 host target protein, VGAM48 host target protein, VGAM51 host target protein, VGAM53 host target protein and VGAM55 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM41, VGAM43, VGAM45, VGAM46, VGAM48, VGAM51, VGAM53 and VGAM55

[59895] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4320(VGR4320) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59896] VGR4320 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4320 gene was detected is described hereinabove with reference to Figs. 6–15.

[59897] VGR4320 gene encodes VGR4320 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59898] VGR4320 precursor RNA folds spatially, forming VGR4320 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4320 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4320 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59899] VGR4320 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM57 precursor RNA, VGAM58 precursor RNA, VGAM61 precursor RNA, VGAM62 precursor RNA, VGAM64 precursor RNA, VGAM65 precursor RNA, VGAM961 precursor RNA and VGAM962 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59900] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM57 RNA, VGAM58 RNA, VGAM61 RNA, VGAM62 RNA, VGAM64 RNA, VGAM65 RNA, VGAM961 RNA and VGAM962 RNA

respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59901] VGAM57 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM57 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM57 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM57 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59902] VGAM58 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM58 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM58 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM58 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59903] VGAM61 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM61 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM61 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM61 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59904] VGAM62 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM62 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM62 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM62 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59905] VGAM64 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM64 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM64 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM64 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59906] VGAM65 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM65 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM65 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM65 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59907] VGAM961 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM961 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM961 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM961 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59908] VGAM962 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM962 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM962 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM962 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59909] It is appreciated that a function of VGR4320 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4320 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4320 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4320 gene: VGAM57 host target protein, VGAM58 host target protein, VGAM61 host target protein, VGAM62 host target protein, VGAM64 host target protein, VGAM65 host target protein, VGAM961 host target protein and VGAM962 host target protein,

herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM57, VGAM58, VGAM61, VGAM62, VGAM64, VGAM65, VGAM961 and VGAM962

[59910] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4321(VGR4321) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59911] VGR4321 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4321 gene was detected is described hereinabove with reference to Figs. 6–15.

[59912] VGR4321 gene encodes VGR4321 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59913] VGR4321 precursor RNA folds spatially, forming VGR4321

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4321 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4321 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59914] VGR4321 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1071 precursor RNA, VGAM1073 precursor RNA, VGAM1834 precursor RNA, VGAM1837 precursor RNA, VGAM1838 precursor RNA, VGAM1839 precursor RNA, VGAM1843 precursor RNA and VGAM2992 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to

VGAM PRECURSOR RNA of Fig. 8.

[59915] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1071 RNA, VGAM1073 RNA, VGAM1834 RNA, VGAM1837 RNA, VGAM1838 RNA, VGAM1839 RNA, VGAM1843 RNA and VGAM2992 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59916] VGAM1071 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1071 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1071 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1071 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59917] VGAM1073 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1073 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1073 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1073 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59918] VGAM1834 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1834 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1834 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1834 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[59919] VGAM1837 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1837 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1837 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1837 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59920] VGAM1838 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1838 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1838 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1838 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59921] VGAM1839 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1839 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1839 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1839 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59922] VGAM1843 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1843 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1843 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM1843 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59923] VGAM2992 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2992 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2992 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2992 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[59924] It is appreciated that a function of VGR4321 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4321 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4321 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4321 gene: VGAM1071 host target protein, VGAM1073 host target protein, VGAM1834 host target protein, VGAM1837 host target protein, VGAM1838 host target protein, VGAM1839 host target protein, VGAM1843 host target protein and VGAM2992 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1071, VGAM1073, VGAM1834, VGAM1837, VGAM1838, VGAM1839, VGAM1843 and VGAM2992

[59925] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4322(VGR4322) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59926] VGR4322 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4322 gene was detected is described hereinabove with reference to Figs. 6–15.

[59927] VGR4322 gene encodes VGR4322 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59928] VGR4322 precursor RNA folds spatially, forming VGR4322 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4322 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4322 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59929] VGR4322 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2993 precursor RNA and VGAM3486 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively,

each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59930] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2993 RNA and VGAM3486 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59931] VGAM2993 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2993 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2993 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2993 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59932] VGAM3486 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3486 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3486 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3486 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59933] It is appreciated that a function of VGR4322 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4322 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4322 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4322 gene: VGAM2993 host target protein and VGAM3486 host target protein, herein schematically represented by VGAM1 HOST TARGET

PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2993 and VGAM3486

[59934] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4323(VGR4323) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59935] VGR4323 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4323 gene was detected is described hereinabove with reference to Figs. 6-15.

[59936] VGR4323 gene encodes VGR4323 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59937] VGR4323 precursor RNA folds spatially, forming VGR4323 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4323 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4323 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59938] VGR4323 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM601 precursor RNA, VGAM1353 precursor RNA, VGAM1354 precursor RNA, VGAM1355 precursor RNA, VGAM1356 precursor RNA, VGAM1357 precursor RNA and VGAM2212 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59939] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM601

RNA, VGAM1353 RNA, VGAM1354 RNA, VGAM1355 RNA, VGAM1356 RNA, VGAM1357 RNA and VGAM2212 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59940] VGAM601 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM601 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM601 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM601 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59941] VGAM1353 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1353 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1353 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1353 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59942] VGAM1354 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1354 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1354 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1354 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59943] VGAM1355 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1355 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1355 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1355 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59944] VGAM1356 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1356 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1356 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1356 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59945] VGAM1357 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1357 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1357 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1357 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59946] VGAM2212 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2212 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2212 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2212 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59947] It is appreciated that a function of VGR4323 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4323 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4323 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4323 gene: VGAM601 host target protein, VGAM1353 host target protein, VGAM1354 host target protein, VGAM1355 host target protein, VGAM1356 host target protein, VGAM1357 host target protein and VGAM2212 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM601, VGAM1353, VGAM1354, VGAM1355, VGAM1356, VGAM1357 and VGAM2212

[59948] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4324(VGR4324) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59949] VGR4324 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4324 gene was detected is described hereinabove with reference to Figs. 6–15.

[59950] VGR4324 gene encodes VGR4324 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59951] VGR4324 precursor RNA folds spatially, forming VGR4324 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4324 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4324 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59952] VGR4324 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3106 precursor RNA and VGAM3550 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59953] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3106 RNA and VGAM3550 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59954] VGAM3106 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3106 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3106 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM3106 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59955] VGAM3550 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3550 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3550 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3550 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59956] It is appreciated that a function of VGR4324 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4324 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4324 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4324 gene: VGAM3106 host target protein and VGAM3550 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3106 and VGAM3550

[59957] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4325(VGR4325) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59958] VGR4325 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4325 gene was detected is described hereinabove with reference to Figs. 6–15.

[59959] VGR4325 gene encodes VGR4325 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[59960] VGR4325 precursor RNA folds spatially, forming VGR4325 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4325 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4325 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59961] VGR4325 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3070 precursor RNA, VGAM3175 precursor RNA and VGAM3476 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59962] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3070 RNA, VGAM3175 RNA and VGAM3476 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59963] VGAM3070 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3070 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3070 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3070 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59964] VGAM3175 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3175 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3175 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3175 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59965] VGAM3476 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3476 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3476 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3476 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59966] It is appreciated that a function of VGR4325 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4325 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4325 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4325 gene: VGAM3070 host target protein, VGAM3175 host target protein and VGAM3476 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3070, VGAM3175 and VGAM3476

[59967] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4326(VGR4326) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59968] VGR4326 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4326 gene was

detected is described hereinabove with reference to Figs. 6–15.

[59969] VGR4326 gene encodes VGR4326 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59970] VGR4326 precursor RNA folds spatially, forming VGR4326 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4326 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4326 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59971] VGR4326 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3644 precursor RNA and VGAM3645 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59972] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3644 RNA and VGAM3645 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59973] VGAM3644 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3644 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3644 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3644 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59974] VGAM3645 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM3645 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3645 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3645 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59975] It is appreciated that a function of VGR4326 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4326 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4326 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4326 gene: VGAM3644 host target protein and VGAM3645 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM3644 and VGAM3645

[59976] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4327(VGR4327) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59977] VGR4327 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4327 gene was detected is described hereinabove with reference to Figs. 6–15.

[59978] VGR4327 gene encodes VGR4327 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59979] VGR4327 precursor RNA folds spatially, forming VGR4327 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4327 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4327 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[59980] VGR4327 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3320 precursor RNA and VGAM3321 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59981] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3320 RNA and VGAM3321 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59982] VGAM3320 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3320 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3320 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3320 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59983] VGAM3321 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3321 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3321 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3321 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59984] It is appreciated that a function of VGR4327 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4327 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4327 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4327 gene: VGAM3320 host target protein and VGAM3321 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN andVGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3320 and VGAM3321

[59985] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4328(VGR4328) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[59986] VGR4328 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4328 gene was detected is described hereinabove with reference to Figs. 6–15.

[59987] VGR4328 gene encodes VGR4328 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[59988] VGR4328 precursor RNA folds spatially, forming VGR4328 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4328 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4328 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[59989] VGR4328 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1766 precursor RNA, VGAM1768 pre–

cursor RNA, VGAM1769 precursor RNA, VGAM1770 precursor RNA, VGAM1772 precursor RNA, VGAM1773 precursor RNA and VGAM3625 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[59990] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1766 RNA, VGAM1768 RNA, VGAM1769 RNA, VGAM1770 RNA, VGAM1772 RNA, VGAM1773 RNA and VGAM3625 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[59991] VGAM1766 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1766 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1766 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1766 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[59992] VGAM1768 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1768 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1768 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1768 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[59993] VGAM1769 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1769 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1769 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1769 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[59994] VGAM1770 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1770 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1770 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1770 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[59995] VGAM1772 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1772 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1772 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1772 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[59996] VGAM1773 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1773 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1773 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1773 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[59997] VGAM3625 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM3625 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3625 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3625 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[59998] It is appreciated that a function of VGR4328 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4328 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4328 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4328 gene: VGAM1766 host target protein, VGAM1768 host target protein, VGAM1769 host target protein, VGAM1770 host target protein, VGAM1772 host target protein, VGAM1773 host

target protein and VGAM3625 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1766, VGAM1768, VGAM1769, VGAM1770, VGAM1772, VGAM1773 and VGAM3625

[59999] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4329(VGR4329) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60000] VGR4329 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4329 gene was detected is described hereinabove with reference to Figs. 6-15.

[60001] VGR4329 gene encodes VGR4329 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60002] VGR4329 precursor RNA folds spatially, forming VGR4329 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4329 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4329 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60003] VGR4329 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3093 precursor RNA, VGAM3094 precursor RNA and VGAM3590 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60004] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM3093 RNA, VGAM3094 RNA and VGAM3590 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60005] VGAM3093 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3093 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3093 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3093 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60006] VGAM3094 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3094 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3094 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3094 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60007] VGAM3590 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3590 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3590 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3590 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60008] It is appreciated that a function of VGR4329 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4329 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4329 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4329 gene: VGAM3093 host target protein, VGAM3094 host target protein and VGAM3590 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3093, VGAM3094 and VGAM3590

[60009] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4330(VGR4330) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60010] VGR4330 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4330 gene was detected is described hereinabove with reference to Figs.

6-15.

[60011] VGR4330 gene encodes VGR4330 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60012] VGR4330 precursor RNA folds spatially, forming VGR4330 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4330 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4330 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60013] VGR4330 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1717 precursor RNA, VGAM1912 precursor RNA, VGAM1913 precursor RNA and VGAM1918 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of

which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60014] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1717 RNA, VGAM1912 RNA, VGAM1913 RNA and VGAM1918 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60015] VGAM1717 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1717 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1717 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1717 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60016] VGAM1912 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1912 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1912 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1912 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60017] VGAM1913 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1913 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1913 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1913 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[60018] VGAM1918 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1918 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1918 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1918 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60019] It is appreciated that a function of VGR4330 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4330 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4330 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4330 gene: VGAM1717

host target protein, VGAM1912 host target protein, VGAM1913 host target protein and VGAM1918 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1717, VGAM1912, VGAM1913 and VGAM1918

[60020] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4331(VGR4331) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60021] VGR4331 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4331 gene was detected is described hereinabove with reference to Figs. 6-15.

[60022] VGR4331 gene encodes VGR4331 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60023] VGR4331 precursor RNA folds spatially, forming VGR4331 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4331 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4331 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60024] VGR4331 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM611 precursor RNA, VGAM612 precursor RNA, VGAM613 precursor RNA, VGAM1148 precursor RNA, VGAM1149 precursor RNA, VGAM1169 precursor RNA, VGAM1170 precursor RNA and VGAM1171 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a

hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60025] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM611 RNA, VGAM612 RNA, VGAM613 RNA, VGAM1148 RNA, VGAM1149 RNA, VGAM1169 RNA, VGAM1170 RNA and VGAM1171 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60026] VGAM611 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM611 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM611 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM611 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[60027] VGAM612 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM612 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM612 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM612 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60028] VGAM613 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM613 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM613 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM613 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60029] VGAM1148 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1148 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1148 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1148 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60030] VGAM1149 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1149 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1149 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM1149 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60031] VGAM1169 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1169 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1169 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1169 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60032] VGAM1170 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1170 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1170 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM1170 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60033] VGAM1171 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1171 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1171 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1171 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60034] It is appreciated that a function of VGR4331 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4331 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4331 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4331 gene: VGAM611 host target protein, VGAM612 host target protein, VGAM613 host target protein, VGAM1148 host target protein, VGAM1149 host target protein, VGAM1169 host target protein, VGAM1170 host target protein and VGAM1171 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM611, VGAM612, VGAM613, VGAM1148, VGAM1149, VGAM1169, VGAM1170 and VGAM1171

[60035] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4332(VGR4332) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60036] VGR4332 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4332 gene was detected is described hereinabove with reference to Figs. 6–15.

[60037] VGR4332 gene encodes VGR4332 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60038] VGR4332 precursor RNA folds spatially, forming VGR4332 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4332 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4332 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60039] VGR4332 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1306 precursor RNA, VGAM1358 precursor RNA, VGAM1359 precursor RNA, VGAM1550 precursor RNA, VGAM1551 precursor RNA, VGAM2358 pre–

cursor RNA, VGAM2368 precursor RNA and VGAM2420 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60040] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1306 RNA, VGAM1358 RNA, VGAM1359 RNA, VGAM1550 RNA, VGAM1551 RNA, VGAM2358 RNA, VGAM2368 RNA and VGAM2420 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60041] VGAM1306 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1306 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1306 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1306 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60042] VGAM1358 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1358 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1358 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1358 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60043] VGAM1359 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1359 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1359 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1359 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60044] VGAM1550 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1550 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1550 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1550 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60045] VGAM1551 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1551 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1551 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1551 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60046] VGAM2358 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2358 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2358 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2358 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60047] VGAM2368 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM2368 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2368 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2368 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60048] VGAM2420 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2420 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2420 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2420 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60049] It is appreciated that a function of VGR4332 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4332 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4332 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4332 gene: VGAM1306 host target protein, VGAM1358 host target protein, VGAM1359 host target protein, VGAM1550 host target protein, VGAM1551 host target protein, VGAM2358 host target protein, VGAM2368 host target protein and VGAM2420 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1306, VGAM1358, VGAM1359, VGAM1550, VGAM1551, VGAM2358, VGAM2368 and VGAM2420

[60050] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4333(VGR4333) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60051] VGR4333 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4333 gene was detected is described hereinabove with reference to Figs. 6–15.

[60052] VGR4333 gene encodes VGR4333 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60053] VGR4333 precursor RNA folds spatially, forming VGR4333 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4333 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4333 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the

second half thereof, as is well known in the art.

[60054] VGR4333 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2421 precursor RNA, VGAM2481 precursor RNA, VGAM2640 precursor RNA, VGAM2670 precursor RNA, VGAM2671 precursor RNA, VGAM2672 precursor RNA, VGAM2697 precursor RNA and VGAM2759 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60055] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2421 RNA, VGAM2481 RNA, VGAM2640 RNA, VGAM2670 RNA, VGAM2671 RNA, VGAM2672 RNA, VGAM2697 RNA and VGAM2759 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60056] VGAM2421 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2421 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2421 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2421 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60057] VGAM2481 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2481 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2481 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM2481 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60058] VGAM2640 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2640 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2640 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2640 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60059] VGAM2670 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2670 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2670 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM2670 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60060] VGAM2671 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2671 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2671 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2671 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60061] VGAM2672 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2672 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2672 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2672 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60062] VGAM2697 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2697 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2697 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2697 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60063] VGAM2759 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2759 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2759 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2759 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60064] It is appreciated that a function of VGR4333 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4333 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4333 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4333 gene: VGAM2421 host target protein, VGAM2481 host target protein, VGAM2640 host target protein, VGAM2670 host target protein, VGAM2671 host target protein, VGAM2672 host target protein, VGAM2697 host target protein and VGAM2759 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM2421, VGAM2481, VGAM2640, VGAM2670, VGAM2671, VGAM2672, VGAM2697 and VGAM2759

[60065] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4334(VGR4334) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60066] VGR4334 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4334 gene was detected is described hereinabove with reference to Figs. 6–15.

[60067] VGR4334 gene encodes VGR4334 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60068] VGR4334 precursor RNA folds spatially, forming VGR4334 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4334 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4334 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60069] VGR4334 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM3436 precursor RNA, VGAM3479 precursor RNA, VGAM3480 precursor RNA and VGAM3627 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60070] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3436 RNA, VGAM3479 RNA, VGAM3480 RNA and VGAM3627

RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60071] VGAM3436 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3436 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3436 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3436 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60072] VGAM3479 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3479 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3479 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3479 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60073] VGAM3480 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3480 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3480 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3480 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60074] VGAM3627 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3627 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3627 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3627 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60075] It is appreciated that a function of VGR4334 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4334 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4334 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4334 gene: VGAM3436 host target protein, VGAM3479 host target protein, VGAM3480 host target protein and VGAM3627 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3436, VGAM3479, VGAM3480 and VGAM3627

[60076] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4335(VGR4335) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60077] VGR4335 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4335 gene was detected is described hereinabove with reference to Figs. 6–15.

[60078] VGR4335 gene encodes VGR4335 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60079] VGR4335 precursor RNA folds spatially, forming VGR4335 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4335 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4335 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60080] VGR4335 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1576 precursor RNA, VGAM2940 precursor RNA, VGAM3160 precursor RNA, VGAM3374 precursor RNA and VGAM3375 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60081] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1576 RNA, VGAM2940 RNA, VGAM3160 RNA, VGAM3374 RNA and VGAM3375 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60082] VGAM1576 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1576 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1576 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1576 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60083] VGAM2940 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2940 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2940 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2940 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[60084] VGAM3160 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3160 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3160 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3160 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60085] VGAM3374 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3374 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3374 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3374 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60086] VGAM3375 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3375 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3375 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3375 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60087] It is appreciated that a function of VGR4335 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4335 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4335 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4335 gene: VGAM1576 host target protein, VGAM2940 host target protein, VGAM3160 host target protein, VGAM3374 host target protein and VGAM3375 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1576, VGAM2940, VGAM3160, VGAM3374 and VGAM3375

[60088] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4336(VGR4336) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60089] VGR4336 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4336 gene was detected is described hereinabove with reference to Figs. 6-15.

[60090] VGR4336 gene encodes VGR4336 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60091] VGR4336 precursor RNA folds spatially, forming VGR4336 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4336 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4336 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60092] VGR4336 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM59 precursor RNA, VGAM69 precursor RNA, VGAM70 precursor RNA, VGAM71 precursor RNA, VGAM74 precursor RNA, VGAM77 precursor RNA, VGAM80 precursor RNA and VGAM81 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR,

VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60093] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM59 RNA, VGAM69 RNA, VGAM70 RNA, VGAM71 RNA, VGAM74 RNA, VGAM77 RNA, VGAM80 RNA and VGAM81 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60094] VGAM59 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM59 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM59 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM59 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60095] VGAM69 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM69 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM69 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM69 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60096] VGAM70 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM70 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM70 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM70 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60097] VGAM71 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM71 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM71 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM71 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60098] VGAM74 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM74 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM74 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM74 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60099] VGAM77 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM77 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM77 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM77 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60100] VGAM80 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM80 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM80 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM80 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60101] VGAM81 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM81 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM81 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM81 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60102] It is appreciated that a function of VGR4336 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4336 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4336 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4336 gene: VGAM59 host target protein, VGAM69 host target protein, VGAM70 host target protein, VGAM71 host target protein, VGAM74 host target protein, VGAM77 host target protein, VGAM80 host target protein and VGAM81 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM59, VGAM69, VGAM70, VGAM71, VGAM74, VGAM77, VGAM80 and VGAM81

[60103] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4337(VGR4337) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60104] VGR4337 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4337 gene was detected is described hereinabove with reference to Figs. 6–15.

[60105] VGR4337 gene encodes VGR4337 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60106] VGR4337 precursor RNA folds spatially, forming VGR4337 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4337 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4337 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60107] VGR4337 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM83 precursor RNA, VGAM85 precursor

RNA, VGAM87 precursor RNA, VGAM88 precursor RNA, VGAM89 precursor RNA, VGAM169 precursor RNA, VGAM172 precursor RNA and VGAM173 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60108] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM83 RNA, VGAM85 RNA, VGAM87 RNA, VGAM88 RNA, VGAM89 RNA, VGAM169 RNA, VGAM172 RNA and VGAM173 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60109] VGAM83 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM83 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM83 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM83 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60110] VGAM85 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM85 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM85 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM85 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60111] VGAM87 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM87 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM87 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM87 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60112] VGAM88 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM88 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM88 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM88 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60113] VGAM89 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM89 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM89 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM89 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60114] VGAM169 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM169 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM169 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM169 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60115] VGAM172 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM172 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM172 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM172 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60116] VGAM173 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM173 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM173 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM173 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of

Fig. 1.

[60117] It is appreciated that a function of VGR4337 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4337 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4337 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4337 gene: VGAM83 host target protein, VGAM85 host target protein, VGAM87 host target protein, VGAM88 host target protein, VGAM89 host target protein, VGAM169 host target protein, VGAM172 host target protein and VGAM173 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM83, VGAM85, VGAM87, VGAM88, VGAM89, VGAM169, VGAM172 and VGAM173

[60118] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4338(VGR4338) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60119] VGR4338 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4338 gene was detected is described hereinabove with reference to Figs. 6–15.

[60120] VGR4338 gene encodes VGR4338 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60121] VGR4338 precursor RNA folds spatially, forming VGR4338 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4338 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4338 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60122] VGR4338 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM177 precursor RNA, VGAM200 precursor RNA, VGAM202 precursor RNA, VGAM204 precursor RNA, VGAM206 precursor RNA, VGAM207 precursor RNA, VGAM209 precursor RNA and VGAM210 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60123] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM177 RNA, VGAM200 RNA, VGAM202 RNA, VGAM204 RNA, VGAM206 RNA, VGAM207 RNA, VGAM209 RNA and VGAM210 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60124] VGAM177 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM177 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM177 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM177 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60125] VGAM200 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM200 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM200 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM200 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60126] VGAM202 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM202 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM202 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM202 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60127] VGAM204 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM204 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM204 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM204 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60128] VGAM206 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM206 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM206 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM206 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60129] VGAM207 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM207 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM207 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM207 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60130] VGAM209 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM209 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM209 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM209 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60131] VGAM210 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM210 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM210 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM210 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60132] It is appreciated that a function of VGR4338 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4338 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4338 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4338 gene: VGAM177 host target protein, VGAM200 host target protein, VGAM202 host target protein, VGAM204 host target protein, VGAM206 host target protein, VGAM207 host target protein, VGAM209 host target protein and VGAM210 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM177, VGAM200, VGAM202, VGAM204, VGAM206, VGAM207, VGAM209 and VGAM210

[60133] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4339(VGR4339) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60134] VGR4339 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4339 gene was detected is described hereinabove with reference to Figs. 6–15.

[60135] VGR4339 gene encodes VGR4339 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60136] VGR4339 precursor RNA folds spatially, forming VGR4339 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4339 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4339 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60137] VGR4339 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM212 precursor RNA, VGAM216 precursor RNA, VGAM254 precursor RNA, VGAM255 precursor RNA, VGAM256 precursor RNA, VGAM261 precursor RNA, VGAM262 precursor RNA and VGAM265 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60138] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM212 RNA, VGAM216 RNA, VGAM254 RNA, VGAM255 RNA, VGAM256 RNA, VGAM261 RNA, VGAM262 RNA and VGAM265 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60139] VGAM212 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM212 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM212 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM212 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60140] VGAM216 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM216 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM216 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM216 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60141] VGAM254 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM254 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM254 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM254 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[60142] VGAM255 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM255 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM255 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM255 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60143] VGAM256 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM256 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM256 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM256 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60144] VGAM261 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM261 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM261 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM261 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60145] VGAM262 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM262 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM262 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM262 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60146] VGAM265 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM265 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM265 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM265 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60147] It is appreciated that a function of VGR4339 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4339 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4339 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4339 gene: VGAM212 host target protein, VGAM216 host target protein, VGAM254 host target protein, VGAM255 host target protein, VGAM256 host target protein, VGAM261 host target protein, VGAM262 host target protein and VGAM265 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM212, VGAM216, VGAM254, VGAM255, VGAM256, VGAM261, VGAM262 and VGAM265

[60148] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4340(VGR4340) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60149] VGR4340 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4340 gene was

detected is described hereinabove with reference to Figs. 6–15.

[60150] VGR4340 gene encodes VGR4340 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60151] VGR4340 precursor RNA folds spatially, forming VGR4340 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4340 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4340 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60152] VGR4340 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM313 precursor RNA, VGAM314 precursor RNA, VGAM316 precursor RNA, VGAM317 precursor RNA, VGAM319 precursor RNA, VGAM320 precursor RNA, VGAM321 precursor RNA and VGAM322 precursor RNA,

herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60153] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM313 RNA, VGAM314 RNA, VGAM316 RNA, VGAM317 RNA, VGAM319 RNA, VGAM320 RNA, VGAM321 RNA and VGAM322 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60154] VGAM313 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM313 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM313 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM313 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60155] VGAM314 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM314 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM314 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM314 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60156] VGAM316 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM316 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM316 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM316 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60157] VGAM317 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM317 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM317 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM317 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60158] VGAM319 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM319 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM319 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM319 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60159] VGAM320 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM320 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM320 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM320 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60160] VGAM321 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM321 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM321 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM321 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60161] VGAM322 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM322 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM322 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM322 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60162] It is appreciated that a function of VGR4340 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4340 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4340 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4340 gene: VGAM313 host target protein, VGAM314 host target protein, VGAM316 host target protein, VGAM317 host target protein, VGAM319 host target protein, VGAM320 host target protein, VGAM321 host target protein and VGAM322 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM313, VGAM314, VGAM316, VGAM317, VGAM319, VGAM320, VGAM321 and VGAM322

[60163] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4341(VGR4341) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60164] VGR4341 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4341 gene was detected is described hereinabove with reference to Figs. 6–15.

[60165] VGR4341 gene encodes VGR4341 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60166] VGR4341 precursor RNA folds spatially, forming VGR4341 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4341 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4341 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60167] VGR4341 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM323 precursor RNA, VGAM324 precursor RNA, VGAM325 precursor RNA, VGAM327 precursor RNA, VGAM333 precursor RNA, VGAM334 precursor RNA, VGAM335 precursor RNA and VGAM339 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60168] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM323 RNA, VGAM324 RNA, VGAM325 RNA, VGAM327 RNA, VGAM333 RNA, VGAM334 RNA, VGAM335 RNA and VGAM339 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60169] VGAM323 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM323 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM323 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM323 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60170] VGAM324 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM324 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM324 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM324 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[60171] VGAM325 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM325 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM325 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM325 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60172] VGAM327 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM327 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM327 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM327 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60173] VGAM333 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM333 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM333 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM333 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60174] VGAM334 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM334 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM334 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM334 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60175] VGAM335 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM335 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM335 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM335 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60176] VGAM339 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM339 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM339 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM339 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60177] It is appreciated that a function of VGR4341 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4341 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4341 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4341 gene: VGAM323 host target protein, VGAM324 host target protein, VGAM325 host target protein, VGAM327 host target protein, VGAM333 host target protein, VGAM334 host target protein, VGAM335 host target protein and VGAM339 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM323, VGAM324, VGAM325, VGAM327, VGAM333,

VGAM334, VGAM335 and VGAM339

[60178] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4342(VGR4342) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60179] VGR4342 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4342 gene was detected is described hereinabove with reference to Figs. 6–15.

[60180] VGR4342 gene encodes VGR4342 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60181] VGR4342 precursor RNA folds spatially, forming VGR4342 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4342 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4342 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60182] VGR4342 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM340 precursor RNA, VGAM344 precursor RNA, VGAM345 precursor RNA, VGAM346 precursor RNA, VGAM347 precursor RNA, VGAM349 precursor RNA, VGAM353 precursor RNA and VGAM354 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60183] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM340 RNA, VGAM344 RNA, VGAM345 RNA, VGAM346 RNA,

VGAM347 RNA, VGAM349 RNA, VGAM353 RNA and VGAM354 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60184] VGAM340 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM340 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM340 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM340 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60185] VGAM344 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM344 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM344 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM344 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60186] VGAM345 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM345 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM345 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM345 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60187] VGAM346 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM346 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM346 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM346 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60188] VGAM347 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM347 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM347 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM347 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60189] VGAM349 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM349 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM349 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM349 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60190] VGAM353 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM353 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM353 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM353 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60191] VGAM354 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM354 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM354 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM354 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60192] It is appreciated that a function of VGR4342 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4342 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4342 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4342 gene: VGAM340 host target protein, VGAM344 host target protein, VGAM345 host target protein, VGAM346 host target protein, VGAM347 host target protein, VGAM349 host target pro-

tein, VGAM353 host target protein and VGAM354 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM340, VGAM344, VGAM345, VGAM346, VGAM347, VGAM349, VGAM353 and VGAM354

[60193] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4343(VGR4343) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60194] VGR4343 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4343 gene was detected is described hereinabove with reference to Figs. 6-15.

[60195] VGR4343 gene encodes VGR4343 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60196] VGR4343 precursor RNA folds spatially, forming VGR4343 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4343 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4343 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60197] VGR4343 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM356 precursor RNA, VGAM358 precursor RNA, VGAM359 precursor RNA, VGAM360 precursor RNA, VGAM828 precursor RNA, VGAM829 precursor RNA, VGAM914 precursor RNA and VGAM915 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60198] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM356 RNA, VGAM358 RNA, VGAM359 RNA, VGAM360 RNA, VGAM828 RNA, VGAM829 RNA, VGAM914 RNA and VGAM915 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60199] VGAM356 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM356 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM356 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM356 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[60200] VGAM358 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM358 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM358 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM358 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60201] VGAM359 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM359 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM359 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM359 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60202] VGAM360 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM360 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM360 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM360 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60203] VGAM828 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM828 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM828 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM828 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60204] VGAM829 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM829 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM829 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM829 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60205] VGAM914 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM914 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM914 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM914 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60206] VGAM915 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM915 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM915 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM915 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60207] It is appreciated that a function of VGR4343 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4343 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4343 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4343 gene: VGAM356 host target protein, VGAM358 host target protein, VGAM359 host target protein, VGAM360 host target protein, VGAM828 host target protein, VGAM829 host target protein, VGAM914 host target protein and VGAM915 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM356, VGAM358, VGAM359, VGAM360, VGAM828, VGAM829, VGAM914 and VGAM915

[60208] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4344(VGR4344) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60209] VGR4344 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4344 gene was detected is described hereinabove with reference to Figs. 6–15.

[60210] VGR4344 gene encodes VGR4344 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60211] VGR4344 precursor RNA folds spatially, forming VGR4344 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4344 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4344 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60212] VGR4344 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM916 precursor RNA, VGAM1410 precursor RNA, VGAM1411 precursor RNA, VGAM1412 precursor RNA, VGAM1414 precursor RNA, VGAM1416 pre–

cursor RNA, VGAM1440 precursor RNA and VGAM1442 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60213] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM916 RNA, VGAM1410 RNA, VGAM1411 RNA, VGAM1412 RNA, VGAM1414 RNA, VGAM1416 RNA, VGAM1440 RNA and VGAM1442 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60214] VGAM916 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM916 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM916 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM916 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60215] VGAM1410 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1410 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1410 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1410 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60216] VGAM1411 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1411 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1411 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1411 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60217] VGAM1412 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1412 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1412 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1412 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60218] VGAM1414 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1414 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1414 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1414 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60219] VGAM1416 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1416 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1416 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1416 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60220] VGAM1440 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM1440 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1440 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1440 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60221] VGAM1442 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1442 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1442 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1442 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60222] It is appreciated that a function of VGR4344 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4344 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4344 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4344 gene: VGAM916 host target protein, VGAM1410 host target protein, VGAM1411 host target protein, VGAM1412 host target protein, VGAM1414 host target protein, VGAM1416 host target protein, VGAM1440 host target protein and VGAM1442 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM916, VGAM1410, VGAM1411, VGAM1412, VGAM1414, VGAM1416, VGAM1440 and VGAM1442

[60223] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4345(VGR4345) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60224] VGR4345 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4345 gene was detected is described hereinabove with reference to Figs. 6–15.

[60225] VGR4345 gene encodes VGR4345 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60226] VGR4345 precursor RNA folds spatially, forming VGR4345 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4345 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4345 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60227] VGR4345 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3063 precursor RNA, VGAM3113 precursor RNA and VGAM3114 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60228] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3063 RNA, VGAM3113 RNA and VGAM3114 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60229] VGAM3063 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3063 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3063 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3063 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60230] VGAM3113 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3113 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3113 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3113 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60231] VGAM3114 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3114 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3114 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3114 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60232] It is appreciated that a function of VGR4345 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4345 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4345 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4345 gene: VGAM3063 host target protein, VGAM3113 host target protein and VGAM3114 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3063, VGAM3113 and VGAM3114

[60233] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4346(VGR4346) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60234] VGR4346 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4346 gene was detected is described hereinabove with reference to Figs. 6–15.

[60235] VGR4346 gene encodes VGR4346 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60236] VGR4346 precursor RNA folds spatially, forming VGR4346 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4346 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4346 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60237] VGR4346 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM68 precursor RNA, VGAM72 precursor RNA, VGAM78 precursor RNA, VGAM79 precursor RNA, VGAM82 precursor RNA, VGAM90 precursor RNA, VGAM94 precursor RNA and VGAM98 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60238] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM68 RNA, VGAM72 RNA, VGAM78 RNA, VGAM79 RNA, VGAM82 RNA, VGAM90 RNA, VGAM94 RNA and VGAM98 RNA re-

spectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60239] VGAM68 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM68 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM68 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM68 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60240] VGAM72 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM72 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM72 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM72 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60241] VGAM78 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM78 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM78 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM78 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60242] VGAM79 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM79 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM79 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM79 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60243] VGAM82 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM82 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM82 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM82 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60244] VGAM90 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM90 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM90 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM90 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60245] VGAM94 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM94 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM94 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM94 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60246] VGAM98 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM98 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM98 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM98 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60247] It is appreciated that a function of VGR4346 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4346 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4346 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4346 gene: VGAM68 host target protein, VGAM72 host target protein, VGAM78 host target protein, VGAM79 host target protein, VGAM82 host target protein, VGAM90 host target protein, VGAM94 host target protein and VGAM98 host target protein, herein

schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM68, VGAM72, VGAM78, VGAM79, VGAM82, VGAM90, VGAM94 and VGAM98

[60248] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4347(VGR4347) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60249] VGR4347 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4347 gene was detected is described hereinabove with reference to Figs. 6-15.

[60250] VGR4347 gene encodes VGR4347 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60251] VGR4347 precursor RNA folds spatially, forming VGR4347

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4347 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4347 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60252] VGR4347 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM100 precursor RNA, VGAM102 precursor RNA, VGAM108 precursor RNA, VGAM109 precursor RNA, VGAM630 precursor RNA, VGAM631 precursor RNA, VGAM632 precursor RNA and VGAM633 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECUR-

SOR RNA of Fig. 8.

[60253] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM100 RNA, VGAM102 RNA, VGAM108 RNA, VGAM109 RNA, VGAM630 RNA, VGAM631 RNA, VGAM632 RNA and VGAM633 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60254] VGAM100 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM100 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM100 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM100 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60255] VGAM102 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM102 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM102 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM102 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60256] VGAM108 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM108 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM108 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM108 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[60257] VGAM109 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM109 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM109 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM109 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60258] VGAM630 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM630 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM630 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM630 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60259] VGAM631 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM631 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM631 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM631 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60260] VGAM632 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM632 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM632 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM632 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60261] VGAM633 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM633 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM633 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM633 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60262] It is appreciated that a function of VGR4347 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4347 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4347 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4347 gene: VGAM100 host target protein, VGAM102 host target protein, VGAM108 host target protein, VGAM109 host target protein, VGAM630 host target protein, VGAM631 host target protein, VGAM632 host target protein and VGAM633 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM100, VGAM102, VGAM108, VGAM109, VGAM630, VGAM631, VGAM632 and VGAM633

[60263] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4348(VGR4348) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60264] VGR4348 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4348 gene was

detected is described hereinabove with reference to Figs. 6–15.

[60265] VGR4348 gene encodes VGR4348 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60266] VGR4348 precursor RNA folds spatially, forming VGR4348 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4348 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4348 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60267] VGR4348 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM634 precursor RNA, VGAM635 precursor RNA, VGAM636 precursor RNA, VGAM682 precursor RNA, VGAM683 precursor RNA, VGAM686 precursor RNA, VGAM689 precursor RNA and VGAM701 precursor RNA,

herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60268] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM634 RNA, VGAM635 RNA, VGAM636 RNA, VGAM682 RNA, VGAM683 RNA, VGAM686 RNA, VGAM689 RNA and VGAM701 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60269] VGAM634 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM634 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM634 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM634 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60270] VGAM635 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM635 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM635 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM635 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60271] VGAM636 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM636 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM636 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM636 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60272] VGAM682 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM682 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM682 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM682 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60273] VGAM683 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM683 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM683 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM683 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60274] VGAM686 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM686 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM686 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM686 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60275] VGAM689 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM689 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM689 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM689 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60276] VGAM701 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM701 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM701 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM701 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60277] It is appreciated that a function of VGR4348 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4348 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4348 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4348 gene: VGAM634 host target protein, VGAM635 host target protein, VGAM636 host target protein, VGAM682 host target protein, VGAM683 host target protein, VGAM686 host target protein, VGAM689 host target protein and VGAM701 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM634, VGAM635, VGAM636, VGAM682, VGAM683, VGAM686, VGAM689 and VGAM701

[60278] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4349(VGR4349) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60279] VGR4349 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4349 gene was detected is described hereinabove with reference to Figs. 6–15.

[60280] VGR4349 gene encodes VGR4349 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60281] VGR4349 precursor RNA folds spatially, forming VGR4349 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4349 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4349 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60282] VGR4349 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM703 precursor RNA, VGAM705 precursor RNA, VGAM706 precursor RNA, VGAM763 precursor RNA, VGAM766 precursor RNA, VGAM767 precursor RNA, VGAM768 precursor RNA and VGAM859 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60283] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM703 RNA, VGAM705 RNA, VGAM706 RNA, VGAM763 RNA, VGAM766 RNA, VGAM767 RNA, VGAM768 RNA and VGAM859 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60284] VGAM703 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM703 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM703 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM703 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60285] VGAM705 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM705 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM705 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM705 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[60286] VGAM706 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM706 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM706 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM706 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60287] VGAM763 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM763 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM763 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM763 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60288] VGAM766 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM766 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM766 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM766 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60289] VGAM767 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM767 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM767 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM767 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60290] VGAM768 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM768 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM768 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM768 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60291] VGAM859 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM859 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM859 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM859 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60292] It is appreciated that a function of VGR4349 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4349 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4349 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4349 gene: VGAM703 host target protein, VGAM705 host target protein, VGAM706 host target protein, VGAM763 host target protein, VGAM766 host target protein, VGAM767 host target protein, VGAM768 host target protein and VGAM859 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM703, VGAM705, VGAM706, VGAM763, VGAM766,

VGAM767, VGAM768 and VGAM859

[60293] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4350(VGR4350) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60294] VGR4350 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4350 gene was detected is described hereinabove with reference to Figs. 6–15.

[60295] VGR4350 gene encodes VGR4350 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60296] VGR4350 precursor RNA folds spatially, forming VGR4350 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4350 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4350 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60297] VGR4350 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM861 precursor RNA, VGAM862 precursor RNA, VGAM1047 precursor RNA, VGAM1109 precursor RNA, VGAM1142 precursor RNA, VGAM1143 precursor RNA, VGAM1244 precursor RNA and VGAM1245 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60298] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM861 RNA, VGAM862 RNA, VGAM1047 RNA, VGAM1109 RNA,

VGAM1142 RNA, VGAM1143 RNA, VGAM1244 RNA and VGAM1245 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60299] VGAM861 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM861 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM861 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM861 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60300] VGAM862 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM862 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM862 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM862 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60301] VGAM1047 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1047 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1047 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1047 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60302] VGAM1109 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1109 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1109 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1109 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60303] VGAM1142 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1142 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1142 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1142 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60304] VGAM1143 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1143 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1143 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1143 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60305] VGAM1244 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1244 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1244 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1244 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60306] VGAM1245 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM1245 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1245 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1245 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60307] It is appreciated that a function of VGR4350 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4350 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4350 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4350 gene: VGAM861 host target protein, VGAM862 host target protein, VGAM1047 host target protein, VGAM1109 host target protein, VGAM1142 host target protein, VGAM1143 host target

protein, VGAM1244 host target protein and VGAM1245 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM861, VGAM862, VGAM1047, VGAM1109, VGAM1142, VGAM1143, VGAM1244 and VGAM1245

[60308] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4351(VGR4351) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60309] VGR4351 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4351 gene was detected is described hereinabove with reference to Figs. 6-15.

[60310] VGR4351 gene encodes VGR4351 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60311] VGR4351 precursor RNA folds spatially, forming VGR4351 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4351 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4351 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60312] VGR4351 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1293 precursor RNA, VGAM1294 precursor RNA, VGAM1321 precursor RNA, VGAM1323 precursor RNA, VGAM1498 precursor RNA, VGAM1500 precursor RNA, VGAM1501 precursor RNA and VGAM1577 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60313] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1293 RNA, VGAM1294 RNA, VGAM1321 RNA, VGAM1323 RNA, VGAM1498 RNA, VGAM1500 RNA, VGAM1501 RNA and VGAM1577 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60314] VGAM1293 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1293 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1293 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1293 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[60315] VGAM1294 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1294 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1294 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1294 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60316] VGAM1321 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1321 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1321 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1321 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60317] VGAM1323 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1323 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1323 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1323 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60318] VGAM1498 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1498 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1498 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM1498 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60319] VGAM1500 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1500 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1500 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1500 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60320] VGAM1501 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1501 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1501 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM1501 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60321] VGAM1577 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1577 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1577 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1577 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60322] It is appreciated that a function of VGR4351 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4351 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4351 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4351 gene: VGAM1293 host target protein, VGAM1294 host target protein, VGAM1321 host target protein, VGAM1323 host target protein, VGAM1498 host target protein, VGAM1500 host target protein, VGAM1501 host target protein and VGAM1577 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1293, VGAM1294, VGAM1321, VGAM1323, VGAM1498, VGAM1500, VGAM1501 and VGAM1577

[60323] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4352(VGR4352) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60324] VGR4352 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4352 gene was detected is described hereinabove with reference to Figs. 6–15.

[60325] VGR4352 gene encodes VGR4352 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60326] VGR4352 precursor RNA folds spatially, forming VGR4352 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4352 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4352 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60327] VGR4352 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1579 precursor RNA, VGAM1580 precursor RNA, VGAM1898 precursor RNA, VGAM1900 pre–

cursor RNA, VGAM1905 precursor RNA, VGAM1907 precursor RNA, VGAM1989 precursor RNA and VGAM1990 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60328] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1579 RNA, VGAM1580 RNA, VGAM1898 RNA, VGAM1900 RNA, VGAM1905 RNA, VGAM1907 RNA, VGAM1989 RNA and VGAM1990 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60329] VGAM1579 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1579 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1579 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1579 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60330] VGAM1580 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1580 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1580 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1580 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60331] VGAM1898 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1898 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1898 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1898 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60332] VGAM1900 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1900 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1900 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1900 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60333] VGAM1905 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM1905 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1905 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1905 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60334] VGAM1907 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1907 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1907 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1907 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60335] VGAM1989 RNA, herein schematically represented by

VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1989 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1989 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1989 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60336] VGAM1990 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1990 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1990 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1990 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60337] It is appreciated that a function of VGR4352 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4352 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4352 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4352 gene: VGAM1579 host target protein, VGAM1580 host target protein, VGAM1898 host target protein, VGAM1900 host target protein, VGAM1905 host target protein, VGAM1907 host target protein, VGAM1989 host target protein and VGAM1990 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1579, VGAM1580, VGAM1898, VGAM1900, VGAM1905, VGAM1907, VGAM1989 and VGAM1990

[60338] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4353(VGR4353) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60339] VGR4353 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4353 gene was detected is described hereinabove with reference to Figs. 6–15.

[60340] VGR4353 gene encodes VGR4353 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60341] VGR4353 precursor RNA folds spatially, forming VGR4353 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4353 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4353 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60342] VGR4353 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2081 precursor RNA, VGAM2082 precursor RNA, VGAM2083 precursor RNA, VGAM2087 precursor RNA, VGAM2088 precursor RNA, VGAM2089 precursor RNA, VGAM2179 precursor RNA and VGAM2181 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60343] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2081 RNA, VGAM2082 RNA, VGAM2083 RNA, VGAM2087 RNA, VGAM2088 RNA, VGAM2089 RNA, VGAM2179 RNA and VGAM2181 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60344] VGAM2081 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2081 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2081 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2081 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60345] VGAM2082 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2082 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2082 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM2082 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60346] VGAM2083 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2083 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2083 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2083 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60347] VGAM2087 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2087 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2087 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2087 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60348] VGAM2088 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2088 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2088 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2088 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60349] VGAM2089 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2089 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2089 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2089 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60350] VGAM2179 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2179 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2179 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2179 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60351] VGAM2181 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2181 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2181 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2181 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60352] It is appreciated that a function of VGR4353 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4353 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4353 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4353 gene: VGAM2081 host target protein, VGAM2082 host target protein, VGAM2083 host target protein, VGAM2087 host target protein, VGAM2088 host target protein, VGAM2089 host target protein, VGAM2179 host target protein and VGAM2181 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through

VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2081, VGAM2082, VGAM2083, VGAM2087, VGAM2088, VGAM2089, VGAM2179 and VGAM2181

[60353] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4354(VGR4354) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60354] VGR4354 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4354 gene was detected is described hereinabove with reference to Figs. 6–15.

[60355] VGR4354 gene encodes VGR4354 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60356] VGR4354 precursor RNA folds spatially, forming VGR4354 folded precursor RNA, herein designated VGR FOLDED

PRECURSOR RNA. It is appreciated that VGR4354 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4354 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60357] VGR4354 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2321 precursor RNA, VGAM2322 precursor RNA, VGAM2323 precursor RNA, VGAM2507 precursor RNA, VGAM2508 precursor RNA, VGAM2599 precursor RNA, VGAM2641 precursor RNA and VGAM2784 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60358] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2321 RNA, VGAM2322 RNA, VGAM2323 RNA, VGAM2507 RNA, VGAM2508 RNA, VGAM2599 RNA, VGAM2641 RNA and VGAM2784 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60359] VGAM2321 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2321 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2321 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2321 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60360] VGAM2322 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2322 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2322 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2322 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60361] VGAM2323 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2323 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2323 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2323 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60362] VGAM2507 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2507 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2507 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2507 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60363] VGAM2508 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2508 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2508 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2508 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[60364] VGAM2599 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2599 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2599 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2599 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60365] VGAM2641 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2641 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2641 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2641 host target protein, herein schematically

represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60366] VGAM2784 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2784 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2784 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2784 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60367] It is appreciated that a function of VGR4354 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4354 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4354 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4354 gene: VGAM2321 host target protein, VGAM2322 host target protein, VGAM2323 host target protein, VGAM2507 host target protein, VGAM2508 host target protein, VGAM2599 host target protein, VGAM2641 host target protein and VGAM2784 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2321, VGAM2322, VGAM2323, VGAM2507, VGAM2508, VGAM2599, VGAM2641 and VGAM2784

[60368] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4355(VGR4355) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60369] VGR4355 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4355 gene was

detected is described hereinabove with reference to Figs. 6–15.

[60370] VGR4355 gene encodes VGR4355 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60371] VGR4355 precursor RNA folds spatially, forming VGR4355 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4355 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4355 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60372] VGR4355 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2785 precursor RNA, VGAM2903 precursor RNA, VGAM2916 precursor RNA, VGAM2938 precursor RNA, VGAM2972 precursor RNA, VGAM2978 precursor RNA, VGAM3003 precursor RNA and VGAM3135

precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60373] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2785 RNA, VGAM2903 RNA, VGAM2916 RNA, VGAM2938 RNA, VGAM2972 RNA, VGAM2978 RNA, VGAM3003 RNA and VGAM3135 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60374] VGAM2785 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2785 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2785 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2785 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60375] VGAM2903 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2903 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2903 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2903 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60376] VGAM2916 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2916 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2916 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2916 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60377] VGAM2938 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2938 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2938 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2938 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60378] VGAM2972 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2972 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2972 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2972 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60379] VGAM2978 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2978 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2978 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2978 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60380] VGAM3003 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3003 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3003 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3003 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60381] VGAM3135 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3135 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3135 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3135 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60382] It is appreciated that a function of VGR4355 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4355 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4355 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4355 gene: VGAM2785 host target protein, VGAM2903 host target protein, VGAM2916 host target protein, VGAM2938 host target protein, VGAM2972 host target protein, VGAM2978 host target protein, VGAM3003 host target protein and VGAM3135 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2785, VGAM2903, VGAM2916, VGAM2938, VGAM2972, VGAM2978, VGAM3003 and VGAM3135

[60383] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4356(VGR4356) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60384] VGR4356 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4356 gene was detected is described hereinabove with reference to Figs. 6–15.

[60385] VGR4356 gene encodes VGR4356 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60386] VGR4356 precursor RNA folds spatially, forming VGR4356 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4356 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4356 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60387] VGR4356 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3298 precursor RNA, VGAM3384 precursor RNA, VGAM3395 precursor RNA, VGAM3456 precursor RNA, VGAM3481 precursor RNA, VGAM3520 precursor RNA, VGAM3577 precursor RNA and VGAM3616 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60388] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3298 RNA, VGAM3384 RNA, VGAM3395 RNA, VGAM3456 RNA, VGAM3481 RNA, VGAM3520 RNA, VGAM3577 RNA and VGAM3616 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[60389] VGAM3298 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3298 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3298 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3298 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60390] VGAM3384 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3384 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3384 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3384 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60391] VGAM3395 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3395 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3395 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3395 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60392] VGAM3456 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3456 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3456 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM3456 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60393] VGAM3481 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3481 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3481 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3481 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60394] VGAM3520 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3520 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3520 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM3520 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60395] VGAM3577 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3577 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3577 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3577 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60396] VGAM3616 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3616 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3616 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3616 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60397] It is appreciated that a function of VGR4356 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4356 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4356 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4356 gene: VGAM3298 host target protein, VGAM3384 host target protein, VGAM3395 host target protein, VGAM3456 host target protein, VGAM3481 host target protein, VGAM3520 host target protein, VGAM3577 host target protein and VGAM3616 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM3298, VGAM3384, VGAM3395, VGAM3456, VGAM3481, VGAM3520, VGAM3577 and VGAM3616

[60398] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4357(VGR4357) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60399] VGR4357 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4357 gene was detected is described hereinabove with reference to Figs. 6–15.

[60400] VGR4357 gene encodes VGR4357 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60401] VGR4357 precursor RNA folds spatially, forming VGR4357 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4357 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4357 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60402] VGR4357 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3618 precursor RNA, VGAM3725 precursor RNA, VGAM3737 precursor RNA, VGAM3752 precursor RNA, VGAM3762 precursor RNA, VGAM3787 precursor RNA, VGAM3826 precursor RNA and VGAM3829 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60403] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM3618 RNA, VGAM3725 RNA, VGAM3737 RNA, VGAM3752 RNA, VGAM3762 RNA, VGAM3787 RNA, VGAM3826 RNA and VGAM3829 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60404] VGAM3618 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3618 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3618 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3618 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60405] VGAM3725 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3725 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3725 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3725 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60406] VGAM3737 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3737 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3737 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3737 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60407] VGAM3752 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM3752 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3752 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3752 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60408] VGAM3762 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3762 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3762 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3762 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60409] VGAM3787 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3787 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3787 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3787 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60410] VGAM3826 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3826 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3826 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3826 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60411] VGAM3829 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3829 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3829 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3829 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60412] It is appreciated that a function of VGR4357 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4357 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4357 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4357 gene: VGAM3618 host target protein, VGAM3725 host target protein,

VGAM3737 host target protein, VGAM3752 host target protein, VGAM3762 host target protein, VGAM3787 host target protein, VGAM3826 host target protein and VGAM3829 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3618, VGAM3725, VGAM3737, VGAM3752, VGAM3762, VGAM3787, VGAM3826 and VGAM3829

[60413] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4358(VGR4358) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60414] VGR4358 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4358 gene was detected is described hereinabove with reference to Figs. 6-15.

[60415] VGR4358 gene encodes VGR4358 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60416] VGR4358 precursor RNA folds spatially, forming VGR4358 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4358 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4358 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60417] VGR4358 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1637 precursor RNA, VGAM1638 precursor RNA and VGAM2688 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig.

8.

[60418] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1637 RNA, VGAM1638 RNA and VGAM2688 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60419] VGAM1637 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1637 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1637 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1637 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60420] VGAM1638 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1638 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1638 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1638 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60421] VGAM2688 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2688 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2688 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2688 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60422] It is appreciated that a function of VGR4358 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4358 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4358 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4358 gene: VGAM1637 host target protein, VGAM1638 host target protein and VGAM2688 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1637, VGAM1638 and VGAM2688

[60423] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4359(VGR4359) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60424] VGR4359 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4359 gene was detected is described hereinabove with reference to Figs. 6–15.

[60425] VGR4359 gene encodes VGR4359 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60426] VGR4359 precursor RNA folds spatially, forming VGR4359 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4359 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4359 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60427] VGR4359 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3202 precursor RNA and VGAM3312 precursor RNA, herein schematically represented by

VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60428] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3202 RNA and VGAM3312 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60429] VGAM3202 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3202 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3202 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3202 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60430] VGAM3312 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3312 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3312 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3312 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60431] It is appreciated that a function of VGR4359 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4359 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4359 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4359 gene: VGAM3202 host target protein and VGAM3312 host target protein,

herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM3202 and VGAM3312

[60432] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4360(VGR4360) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60433] VGR4360 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4360 gene was detected is described hereinabove with reference to Figs. 6–15.

[60434] VGR4360 gene encodes VGR4360 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60435] VGR4360 precursor RNA folds spatially, forming VGR4360 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4360 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4360 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60436] VGR4360 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3468 precursor RNA and VGAM3732 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60437] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3468 RNA and VGAM3732 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM

RNA of Fig. 8.

[60438] VGAM3468 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3468 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3468 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3468 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60439] VGAM3732 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3732 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3732 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3732 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60440] It is appreciated that a function of VGR4360 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4360 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4360 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4360 gene: VGAM3468 host target protein and VGAM3732 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3468 and VGAM3732

[60441] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4361(VGR4361) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[60442] VGR4361 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4361 gene was detected is described hereinabove with reference to Figs. 6–15.

[60443] VGR4361 gene encodes VGR4361 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60444] VGR4361 precursor RNA folds spatially, forming VGR4361 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4361 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4361 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60445] VGR4361 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM532 precursor RNA, VGAM533 precursor RNA, VGAM2664 precursor RNA, VGAM2665 precursor RNA, VGAM2702 precursor RNA, VGAM2703 precursor RNA and VGAM2851 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60446] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM532 RNA, VGAM533 RNA, VGAM2664 RNA, VGAM2665 RNA, VGAM2702 RNA, VGAM2703 RNA and VGAM2851 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60447] VGAM532 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM532 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM532 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM532 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60448] VGAM533 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM533 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM533 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM533 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60449] VGAM2664 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM2664 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2664 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2664 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60450] VGAM2665 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2665 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2665 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2665 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60451] VGAM2702 RNA, herein schematically represented by

VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2702 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2702 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2702 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60452] VGAM2703 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2703 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2703 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2703 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60453] VGAM2851 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2851 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2851 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2851 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60454] It is appreciated that a function of VGR4361 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4361 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4361 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4361 gene: VGAM532 host target protein, VGAM533 host target protein, VGAM2664

host target protein, VGAM2665 host target protein, VGAM2702 host target protein, VGAM2703 host target protein and VGAM2851 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM532, VGAM533, VGAM2664, VGAM2665, VGAM2702, VGAM2703 and VGAM2851

[60455] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4362(VGR4362) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60456] VGR4362 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4362 gene was detected is described hereinabove with reference to Figs. 6-15.

[60457] VGR4362 gene encodes VGR4362 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60458] VGR4362 precursor RNA folds spatially, forming VGR4362 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4362 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4362 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60459] VGR4362 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3057 precursor RNA and VGAM3058 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60460] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3057 RNA and VGAM3058 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60461] VGAM3057 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3057 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3057 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3057 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60462] VGAM3058 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3058 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3058 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3058 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60463] It is appreciated that a function of VGR4362 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4362 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4362 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4362 gene: VGAM3057 host target protein and VGAM3058 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3057 and VGAM3058

[60464] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4363(VGR4363) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60465] VGR4363 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4363 gene was detected is described hereinabove with reference to Figs. 6–15.

[60466] VGR4363 gene encodes VGR4363 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60467] VGR4363 precursor RNA folds spatially, forming VGR4363 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4363 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4363 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60468] VGR4363 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM1224 precursor RNA, VGAM1225 precursor RNA, VGAM1227 precursor RNA, VGAM1228 precursor RNA, VGAM1230 precursor RNA, VGAM1304 precursor RNA and VGAM3044 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60469] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1224 RNA, VGAM1225 RNA, VGAM1227 RNA, VGAM1228 RNA, VGAM1230 RNA, VGAM1304 RNA and VGAM3044 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5

RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60470] VGAM1224 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1224 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1224 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1224 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60471] VGAM1225 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1225 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1225 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1225 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60472] VGAM1227 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1227 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1227 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1227 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60473] VGAM1228 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1228 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1228 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1228 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60474] VGAM1230 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1230 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1230 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1230 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60475] VGAM1304 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1304 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1304 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1304 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60476] VGAM3044 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3044 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3044 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3044 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60477] It is appreciated that a function of VGR4363 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4363 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4363

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4363 gene: VGAM1224 host target protein, VGAM1225 host target protein, VGAM1227 host target protein, VGAM1228 host target protein, VGAM1230 host target protein, VGAM1304 host target protein and VGAM3044 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1224, VGAM1225, VGAM1227, VGAM1228, VGAM1230, VGAM1304 and VGAM3044

[60478] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4364(VGR4364) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60479] VGR4364 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4364 gene was detected is described hereinabove with reference to Figs. 6–15.

[60480] VGR4364 gene encodes VGR4364 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60481] VGR4364 precursor RNA folds spatially, forming VGR4364 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4364 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4364 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60482] VGR4364 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2441 precursor RNA, VGAM2442 precursor RNA, VGAM2559 precursor RNA, VGAM2560 pre–

cursor RNA and VGAM2561 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60483] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2441 RNA, VGAM2442 RNA, VGAM2559 RNA, VGAM2560 RNA and VGAM2561 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60484] VGAM2441 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2441 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2441 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM2441 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60485] VGAM2442 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2442 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2442 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2442 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60486] VGAM2559 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2559 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2559 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM2559 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60487] VGAM2560 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2560 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2560 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2560 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60488] VGAM2561 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2561 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2561 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2561 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60489] It is appreciated that a function of VGR4364 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4364 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4364 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4364 gene: VGAM2441 host target protein, VGAM2442 host target protein, VGAM2559 host target protein, VGAM2560 host target protein and VGAM2561 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2441, VGAM2442, VGAM2559, VGAM2560 and VGAM2561

[60490] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4365(VGR4365) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60491] VGR4365 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4365 gene was detected is described hereinabove with reference to Figs. 6–15.

[60492] VGR4365 gene encodes VGR4365 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60493] VGR4365 precursor RNA folds spatially, forming VGR4365 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4365 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4365 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60494] VGR4365 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2334 precursor RNA, VGAM2335 precursor RNA and VGAM2336 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60495] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2334 RNA, VGAM2335 RNA and VGAM2336 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60496] VGAM2334 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM2334 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2334 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2334 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60497] VGAM2335 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2335 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2335 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2335 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60498] VGAM2336 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2336 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2336 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2336 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60499] It is appreciated that a function of VGR4365 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4365 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4365 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4365 gene: VGAM2334 host target protein, VGAM2335 host target protein and VGAM2336 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2334, VGAM2335 and VGAM2336

[60500] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4366(VGR4366) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60501] VGR4366 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4366 gene was detected is described hereinabove with reference to Figs. 6–15.

[60502] VGR4366 gene encodes VGR4366 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60503] VGR4366 precursor RNA folds spatially, forming VGR4366 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4366 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4366 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60504] VGR4366 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2237 precursor RNA and VGAM2238 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60505] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2237 RNA and VGAM2238 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM

RNA of Fig. 8.

[60506] VGAM2237 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2237 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2237 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2237 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60507] VGAM2238 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2238 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2238 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2238 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60508] It is appreciated that a function of VGR4366 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4366 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4366 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4366 gene: VGAM2237 host target protein and VGAM2238 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2237 and VGAM2238

[60509] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4367(VGR4367) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[60510] VGR4367 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4367 gene was detected is described hereinabove with reference to Figs. 6–15.

[60511] VGR4367 gene encodes VGR4367 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60512] VGR4367 precursor RNA folds spatially, forming VGR4367 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4367 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4367 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60513] VGR4367 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1534 precursor RNA and VGAM1535 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60514] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1534 RNA and VGAM1535 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60515] VGAM1534 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1534 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1534 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM1534 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60516] VGAM1535 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1535 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1535 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1535 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60517] It is appreciated that a function of VGR4367 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4367 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4367 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4367 gene: VGAM1534 host target protein and VGAM1535 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM1534 and VGAM1535

[60518] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4368(VGR4368) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60519] VGR4368 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4368 gene was detected is described hereinabove with reference to Figs. 6-15.

[60520] VGR4368 gene encodes VGR4368 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60521] VGR4368 precursor RNA folds spatially, forming VGR4368 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4368 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4368 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60522] VGR4368 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM3213 precursor RNA, VGAM3214 precursor RNA, VGAM3461 precursor RNA, VGAM3462 precursor RNA, VGAM3463 precursor RNA and VGAM3713 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60523] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3213 RNA, VGAM3214 RNA, VGAM3461 RNA, VGAM3462 RNA, VGAM3463 RNA and VGAM3713 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60524] VGAM3213 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3213 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3213 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3213 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60525] VGAM3214 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM3214 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3214 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3214 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60526] VGAM3461 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3461 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3461 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3461 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60527] VGAM3462 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3462 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3462 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3462 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60528] VGAM3463 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3463 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3463 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3463 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60529] VGAM3713 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3713 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3713 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3713 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60530] It is appreciated that a function of VGR4368 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4368 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4368 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4368 gene: VGAM3213 host target protein, VGAM3214 host target protein,

VGAM3461 host target protein, VGAM3462 host target protein, VGAM3463 host target protein and VGAM3713 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3213, VGAM3214, VGAM3461, VGAM3462, VGAM3463 and VGAM3713

[60531] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4369(VGR4369) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60532] VGR4369 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4369 gene was detected is described hereinabove with reference to Figs. 6–15.

[60533] VGR4369 gene encodes VGR4369 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[60534] VGR4369 precursor RNA folds spatially, forming VGR4369 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4369 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4369 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60535] VGR4369 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2155 precursor RNA, VGAM2156 precursor RNA, VGAM2947 precursor RNA and VGAM3309 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60536] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2155 RNA, VGAM2156 RNA, VGAM2947 RNA and VGAM3309 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60537] VGAM2155 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2155 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2155 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2155 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60538] VGAM2156 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2156 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2156 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2156 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60539] VGAM2947 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2947 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2947 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2947 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60540] VGAM3309 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM3309 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3309 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3309 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60541] It is appreciated that a function of VGR4369 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4369 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4369 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4369 gene: VGAM2155 host target protein, VGAM2156 host target protein, VGAM2947 host target protein and VGAM3309 host target protein, herein schematically represented by VGAM1 HOST

TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2155, VGAM2156, VGAM2947 and VGAM3309

[60542] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4370(VGR4370) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60543] VGR4370 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4370 gene was detected is described hereinabove with reference to Figs. 6–15.

[60544] VGR4370 gene encodes VGR4370 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60545] VGR4370 precursor RNA folds spatially, forming VGR4370 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4370 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4370 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60546] VGR4370 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1478 precursor RNA, VGAM1481 precursor RNA, VGAM1482 precursor RNA, VGAM1487 precursor RNA and VGAM1488 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60547] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1478 RNA, VGAM1481 RNA, VGAM1482 RNA, VGAM1487 RNA

and VGAM1488 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60548] VGAM1478 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1478 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1478 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1478 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60549] VGAM1481 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1481 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1481 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1481 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60550] VGAM1482 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1482 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1482 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1482 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60551] VGAM1487 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1487 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1487 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1487 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60552] VGAM1488 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1488 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1488 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1488 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60553] It is appreciated that a function of VGR4370 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4370 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4370 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4370 gene: VGAM1478 host target protein, VGAM1481 host target protein, VGAM1482 host target protein, VGAM1487 host target protein and VGAM1488 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1478, VGAM1481, VGAM1482, VGAM1487 and VGAM1488

[60554] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4371(VGR4371) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60555] VGR4371 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4371 gene was detected is described hereinabove with reference to Figs. 6–15.

[60556] VGR4371 gene encodes VGR4371 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60557] VGR4371 precursor RNA folds spatially, forming VGR4371 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4371 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4371 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60558] VGR4371 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM160 precursor RNA, VGAM570 precursor RNA, VGAM571 precursor RNA, VGAM574 precursor RNA, VGAM576 precursor RNA, VGAM1085 precursor

RNA, VGAM1086 precursor RNA and VGAM1089 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60559] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM160 RNA, VGAM570 RNA, VGAM571 RNA, VGAM574 RNA, VGAM576 RNA, VGAM1085 RNA, VGAM1086 RNA and VGAM1089 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60560] VGAM160 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM160 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM160 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM160 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60561] VGAM570 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM570 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM570 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM570 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60562] VGAM571 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM571 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM571 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM571 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60563] VGAM574 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM574 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM574 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM574 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60564] VGAM576 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM576 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM576 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM576 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60565] VGAM1085 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1085 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1085 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1085 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60566] VGAM1086 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM1086 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1086 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1086 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60567] VGAM1089 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1089 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1089 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1089 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60568] It is appreciated that a function of VGR4371 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4371 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4371 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4371 gene: VGAM160 host target protein, VGAM570 host target protein, VGAM571 host target protein, VGAM574 host target protein, VGAM576 host target protein, VGAM1085 host target protein, VGAM1086 host target protein and VGAM1089 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM160, VGAM570, VGAM571, VGAM574, VGAM576, VGAM1085, VGAM1086 and VGAM1089

[60569] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4372(VGR4372) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60570] VGR4372 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4372 gene was detected is described hereinabove with reference to Figs. 6–15.

[60571] VGR4372 gene encodes VGR4372 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60572] VGR4372 precursor RNA folds spatially, forming VGR4372 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4372 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4372 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60573] VGR4372 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1090 precursor RNA, VGAM1115 precursor RNA, VGAM1181 precursor RNA, VGAM1182 precursor RNA, VGAM1247 precursor RNA, VGAM1330 precursor RNA, VGAM1331 precursor RNA and VGAM1332 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60574] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1090 RNA, VGAM1115 RNA, VGAM1181 RNA, VGAM1182 RNA, VGAM1247 RNA, VGAM1330 RNA, VGAM1331 RNA and VGAM1332 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[60575] VGAM1090 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1090 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1090 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1090 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60576] VGAM1115 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1115 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1115 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1115 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60577] VGAM1181 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1181 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1181 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1181 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60578] VGAM1182 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1182 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1182 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM1182 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60579] VGAM1247 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1247 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1247 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1247 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60580] VGAM1330 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1330 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1330 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1330 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60581] VGAM1331 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1331 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1331 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1331 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60582] VGAM1332 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1332 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1332 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1332 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60583] It is appreciated that a function of VGR4372 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4372 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4372 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4372 gene: VGAM1090 host target protein, VGAM1115 host target protein, VGAM1181 host target protein, VGAM1182 host target protein, VGAM1247 host target protein, VGAM1330 host target protein, VGAM1331 host target protein and VGAM1332 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM1090, VGAM1115, VGAM1181, VGAM1182, VGAM1247, VGAM1330, VGAM1331 and VGAM1332

[60584] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4373(VGR4373) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60585] VGR4373 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4373 gene was detected is described hereinabove with reference to Figs. 6–15.

[60586] VGR4373 gene encodes VGR4373 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60587] VGR4373 precursor RNA folds spatially, forming VGR4373 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4373 folded precursor RNA, herein designated VGR FOLDED PRECUR–

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4373 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60588] VGR4373 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1428 precursor RNA, VGAM1430 precursor RNA, VGAM1489 precursor RNA, VGAM1490 precursor RNA, VGAM1491 precursor RNA, VGAM1496 precursor RNA, VGAM1527 precursor RNA and VGAM1751 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60589] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1428 RNA, VGAM1430 RNA, VGAM1489 RNA, VGAM1490 RNA, VGAM1491 RNA, VGAM1496 RNA, VGAM1527 RNA and VGAM1751 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60590] VGAM1428 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1428 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1428 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1428 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60591] VGAM1430 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1430 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1430 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1430 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60592] VGAM1489 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1489 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1489 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1489 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60593] VGAM1490 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM1490 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1490 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1490 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60594] VGAM1491 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1491 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1491 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1491 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60595] VGAM1496 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1496 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1496 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1496 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60596] VGAM1527 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1527 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1527 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1527 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60597] VGAM1751 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1751 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1751 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1751 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60598] It is appreciated that a function of VGR4373 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4373 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4373 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4373 gene: VGAM1428 host target protein, VGAM1430 host target protein,

VGAM1489 host target protein, VGAM1490 host target protein, VGAM1491 host target protein, VGAM1496 host target protein, VGAM1527 host target protein and VGAM1751 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1428, VGAM1430, VGAM1489, VGAM1490, VGAM1491, VGAM1496, VGAM1527 and VGAM1751

[60599] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4374(VGR4374) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60600] VGR4374 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4374 gene was detected is described hereinabove with reference to Figs. 6-15.

[60601] VGR4374 gene encodes VGR4374 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60602] VGR4374 precursor RNA folds spatially, forming VGR4374 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4374 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4374 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60603] VGR4374 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1752 precursor RNA, VGAM1755 precursor RNA, VGAM1966 precursor RNA, VGAM1967 precursor RNA, VGAM1968 precursor RNA, VGAM1970 precursor RNA, VGAM2519 precursor RNA and VGAM2525 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60604] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1752 RNA, VGAM1755 RNA, VGAM1966 RNA, VGAM1967 RNA, VGAM1968 RNA, VGAM1970 RNA, VGAM2519 RNA and VGAM2525 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60605] VGAM1752 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1752 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1752 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM1752 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60606] VGAM1755 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1755 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1755 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1755 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60607] VGAM1966 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1966 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1966 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1966 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60608] VGAM1967 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1967 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1967 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1967 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60609] VGAM1968 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1968 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1968 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1968 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60610] VGAM1970 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1970 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1970 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1970 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60611] VGAM2519 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2519 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2519 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2519 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60612] VGAM2525 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2525 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2525 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2525 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60613] It is appreciated that a function of VGR4374 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4374 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4374 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4374 gene: VGAM1752 host target protein, VGAM1755 host target protein, VGAM1966 host target protein, VGAM1967 host target protein, VGAM1968 host target protein, VGAM1970 host target protein, VGAM2519 host target protein and VGAM2525 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1752, VGAM1755, VGAM1966, VGAM1967, VGAM1968, VGAM1970, VGAM2519 and VGAM2525

[60614] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4375(VGR4375) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[60615] VGR4375 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4375 gene was detected is described hereinabove with reference to Figs. 6–15.

[60616] VGR4375 gene encodes VGR4375 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60617] VGR4375 precursor RNA folds spatially, forming VGR4375 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4375 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4375 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60618] VGR4375 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM2941 precursor RNA, VGAM3028 precursor RNA, VGAM3029 precursor RNA, VGAM3030 precursor RNA and VGAM3419 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60619] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2941 RNA, VGAM3028 RNA, VGAM3029 RNA, VGAM3030 RNA and VGAM3419 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60620] VGAM2941 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2941 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2941 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2941 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60621] VGAM3028 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3028 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3028 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3028 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60622] VGAM3029 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3029 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3029 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3029 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60623] VGAM3030 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3030 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3030 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3030 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60624] VGAM3419 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3419 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3419 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3419 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60625] It is appreciated that a function of VGR4375 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4375 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4375 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4375 gene: VGAM2941 host target protein, VGAM3028 host target protein, VGAM3029 host target protein, VGAM3030 host target protein and VGAM3419 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2941, VGAM3028, VGAM3029, VGAM3030 and VGAM3419

[60626] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4376(VGR4376) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60627] VGR4376 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4376 gene was detected is described hereinabove with reference to Figs. 6–15.

[60628] VGR4376 gene encodes VGR4376 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60629] VGR4376 precursor RNA folds spatially, forming VGR4376 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4376 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4376 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60630] VGR4376 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3026 precursor RNA, VGAM3027 precursor RNA and VGAM3676 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60631] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3026 RNA, VGAM3027 RNA and VGAM3676 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM

RNAs corresponding to VGAM RNA of Fig. 8.

[60632] VGAM3026 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3026 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3026 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3026 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60633] VGAM3027 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3027 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3027 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3027 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60634] VGAM3676 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3676 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3676 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3676 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60635] It is appreciated that a function of VGR4376 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4376 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4376 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4376 gene: VGAM3026 host target protein, VGAM3027 host target protein and VGAM3676 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3026, VGAM3027 and VGAM3676

[60636] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4377(VGR4377) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60637] VGR4377 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4377 gene was detected is described hereinabove with reference to Figs. 6-15.

[60638] VGR4377 gene encodes VGR4377 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60639] VGR4377 precursor RNA folds spatially, forming VGR4377 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4377 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4377 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60640] VGR4377 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2002 precursor RNA and VGAM3747 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60641] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2002

RNA and VGAM3747 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60642] VGAM2002 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2002 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2002 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2002 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60643] VGAM3747 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3747 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3747 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3747 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [60644] It is appreciated that a function of VGR4377 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4377 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4377 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4377 gene: VGAM2002 host target protein and VGAM3747 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2002 and VGAM3747
- [60645] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4378(VGR4378) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60646] VGR4378 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4378 gene was detected is described hereinabove with reference to Figs. 6–15.

[60647] VGR4378 gene encodes VGR4378 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60648] VGR4378 precursor RNA folds spatially, forming VGR4378 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4378 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4378 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[60649] VGR4378 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM554 precursor RNA, VGAM555 precursor RNA, VGAM556 precursor RNA, VGAM1588 precursor RNA, VGAM1589 precursor RNA, VGAM1590 precursor RNA, VGAM1592 precursor RNA and VGAM1593 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60650] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM554 RNA, VGAM555 RNA, VGAM556 RNA, VGAM1588 RNA, VGAM1589 RNA, VGAM1590 RNA, VGAM1592 RNA and VGAM1593 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60651] VGAM554 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM554 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM554 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM554 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60652] VGAM555 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM555 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM555 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM555 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60653] VGAM556 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM556 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM556 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM556 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60654] VGAM1588 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1588 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1588 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1588 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60655] VGAM1589 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1589 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1589 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1589 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60656] VGAM1590 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1590 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1590 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1590 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60657] VGAM1592 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1592 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1592 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1592 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60658] VGAM1593 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1593 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1593 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1593 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60659] It is appreciated that a function of VGR4378 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4378 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4378 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4378 gene: VGAM554 host target protein, VGAM555 host target protein, VGAM556 host target protein, VGAM1588 host target protein, VGAM1589 host target protein, VGAM1590 host target protein, VGAM1592 host target protein and VGAM1593 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host tar-

get genes is elaborated hereinabove with reference to VGAM554, VGAM555, VGAM556, VGAM1588, VGAM1589, VGAM1590, VGAM1592 and VGAM1593

[60660] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4379(VGR4379) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60661] VGR4379 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4379 gene was detected is described hereinabove with reference to Figs. 6–15.

[60662] VGR4379 gene encodes VGR4379 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60663] VGR4379 precursor RNA folds spatially, forming VGR4379 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4379 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4379 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60664] VGR4379 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM194 precursor RNA, VGAM592 precursor RNA, VGAM595 precursor RNA, VGAM649 precursor RNA, VGAM651 precursor RNA, VGAM654 precursor RNA, VGAM1387 precursor RNA and VGAM1390 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60665] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM194 RNA, VGAM592 RNA, VGAM595 RNA, VGAM649 RNA, VGAM651 RNA, VGAM654 RNA, VGAM1387 RNA and VGAM1390 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60666] VGAM194 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM194 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM194 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM194 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60667] VGAM592 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM592 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM592 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM592 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60668] VGAM595 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM595 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM595 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM595 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60669] VGAM649 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM649 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM649 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM649 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60670] VGAM651 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM651 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM651 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM651 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60671] VGAM654 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM654 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM654 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM654 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60672] VGAM1387 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1387 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1387 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1387 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60673] VGAM1390 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1390 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1390 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1390 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60674] It is appreciated that a function of VGR4379 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4379 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4379 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4379 gene: VGAM194 host target protein, VGAM592 host target protein, VGAM595

host target protein, VGAM649 host target protein, VGAM651 host target protein, VGAM654 host target protein, VGAM1387 host target protein and VGAM1390 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM194, VGAM592, VGAM595, VGAM649, VGAM651, VGAM654, VGAM1387 and VGAM1390

[60675] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4380(VGR4380) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60676] VGR4380 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4380 gene was detected is described hereinabove with reference to Figs. 6-15.

[60677] VGR4380 gene encodes VGR4380 precursor RNA, herein

designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60678] VGR4380 precursor RNA folds spatially, forming VGR4380 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4380 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4380 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60679] VGR4380 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1741 precursor RNA, VGAM1744 precursor RNA, VGAM2115 precursor RNA, VGAM2215 precursor RNA, VGAM2216 precursor RNA, VGAM2379 precursor RNA, VGAM2401 precursor RNA and VGAM2471 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR,

VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60680] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1741 RNA, VGAM1744 RNA, VGAM2115 RNA, VGAM2215 RNA, VGAM2216 RNA, VGAM2379 RNA, VGAM2401 RNA and VGAM2471 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60681] VGAM1741 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1741 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1741 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM1741 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60682] VGAM1744 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1744 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1744 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1744 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60683] VGAM2115 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2115 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2115 host target RNA, herein

schematically represented by VGAM3 HOST TARGET RNA into VGAM2115 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60684] VGAM2215 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2215 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2215 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2215 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60685] VGAM2216 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2216 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2216 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2216 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60686] VGAM2379 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2379 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2379 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2379 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60687] VGAM2401 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2401 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2401 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2401 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60688] VGAM2471 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2471 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2471 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2471 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60689] It is appreciated that a function of VGR4380 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4380 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4380 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4380 gene: VGAM1741 host target protein, VGAM1744 host target protein, VGAM2115 host target protein, VGAM2215 host target protein, VGAM2216 host target protein, VGAM2379 host target protein, VGAM2401 host target protein and VGAM2471 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1741, VGAM1744, VGAM2115, VGAM2215, VGAM2216, VGAM2379, VGAM2401 and VGAM2471

[60690] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4381(VGR4381) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[60691] VGR4381 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4381 gene was detected is described hereinabove with reference to Figs. 6–15.

[60692] VGR4381 gene encodes VGR4381 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60693] VGR4381 precursor RNA folds spatially, forming VGR4381 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4381 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4381 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60694] VGR4381 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 6 separate VGAM pre–

cursor RNAs, VGAM2472 precursor RNA, VGAM2530 precursor RNA, VGAM2963 precursor RNA, VGAM2984 precursor RNA, VGAM3517 precursor RNA and VGAM3786 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60695] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2472 RNA, VGAM2530 RNA, VGAM2963 RNA, VGAM2984 RNA, VGAM3517 RNA and VGAM3786 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60696] VGAM2472 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2472 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2472 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2472 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60697] VGAM2530 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2530 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2530 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2530 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60698] VGAM2963 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2963 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2963 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2963 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60699] VGAM2984 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2984 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2984 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2984 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60700] VGAM3517 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3517 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3517 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3517 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60701] VGAM3786 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3786 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3786 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3786 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60702] It is appreciated that a function of VGR4381 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4381 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4381 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4381 gene: VGAM2472 host target protein, VGAM2530 host target protein, VGAM2963 host target protein, VGAM2984 host target protein, VGAM3517 host target protein and VGAM3786 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2472, VGAM2530, VGAM2963, VGAM2984, VGAM3517 and VGAM3786

[60703] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4382(VGR4382) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[60704] VGR4382 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4382 gene was detected is described hereinabove with reference to Figs. 6–15.

[60705] VGR4382 gene encodes VGR4382 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60706] VGR4382 precursor RNA folds spatially, forming VGR4382 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4382 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4382 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60707] VGR4382 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 6 separate VGAM precursor RNAs, VGAM1235 precursor RNA, VGAM1238 precursor RNA, VGAM1239 precursor RNA, VGAM1240 precursor RNA, VGAM1241 precursor RNA and VGAM2669 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR and VGAM6 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60708] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1235 RNA, VGAM1238 RNA, VGAM1239 RNA, VGAM1240 RNA, VGAM1241 RNA and VGAM2669 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA and VGAM6 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60709] VGAM1235 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1235 host target RNA, herein schematically represented by VGAM1

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1235 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1235 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60710] VGAM1238 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1238 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1238 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1238 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60711] VGAM1239 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1239 host

target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1239 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1239 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60712] VGAM1240 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1240 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1240 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1240 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60713] VGAM1241 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding

site located in an untranslated region of VGAM1241 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1241 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1241 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60714] VGAM2669 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2669 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2669 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2669 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60715] It is appreciated that a function of VGR4382 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4382 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4382 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4382 gene: VGAM1235 host target protein, VGAM1238 host target protein, VGAM1239 host target protein, VGAM1240 host target protein, VGAM1241 host target protein and VGAM2669 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1235, VGAM1238, VGAM1239, VGAM1240, VGAM1241 and VGAM2669

[60716] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4383(VGR4383) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60717] VGR4383 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4383 gene was detected is described hereinabove with reference to Figs. 6–15.

[60718] VGR4383 gene encodes VGR4383 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60719] VGR4383 precursor RNA folds spatially, forming VGR4383 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4383 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4383 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60720] VGR4383 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM260 precursor RNA, VGAM263 precursor RNA, VGAM264 precursor RNA, VGAM266 precursor RNA and VGAM2732 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60721] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM260 RNA, VGAM263 RNA, VGAM264 RNA, VGAM266 RNA and VGAM2732 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60722] VGAM260 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM260 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM260 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM260 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60723] VGAM263 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM263 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM263 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM263 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60724] VGAM264 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM264 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM264 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM264 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60725] VGAM266 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM266 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM266 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM266 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60726] VGAM2732 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2732 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2732 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2732 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60727] It is appreciated that a function of VGR4383 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4383 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4383 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4383 gene: VGAM260 host target protein, VGAM263 host target protein, VGAM264 host target protein, VGAM266 host target protein and VGAM2732 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through

VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM260, VGAM263, VGAM264, VGAM266 and VGAM2732

[60728] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4384(VGR4384) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60729] VGR4384 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4384 gene was detected is described hereinabove with reference to Figs. 6–15.

[60730] VGR4384 gene encodes VGR4384 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60731] VGR4384 precursor RNA folds spatially, forming VGR4384 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4384 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4384 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60732] VGR4384 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2176 precursor RNA and VGAM2177 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60733] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2176 RNA and VGAM2177 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM

RNA of Fig. 8.

[60734] VGAM2176 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2176 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2176 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2176 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60735] VGAM2177 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2177 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2177 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2177 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60736] It is appreciated that a function of VGR4384 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4384 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4384 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4384 gene: VGAM2176 host target protein and VGAM2177 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2176 and VGAM2177

[60737] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4385(VGR4385) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[60738] VGR4385 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4385 gene was detected is described hereinabove with reference to Figs. 6–15.

[60739] VGR4385 gene encodes VGR4385 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60740] VGR4385 precursor RNA folds spatially, forming VGR4385 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4385 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4385 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60741] VGR4385 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM73 precursor RNA and VGAM75 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60742] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM73 RNA and VGAM75 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60743] VGAM73 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM73 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM73 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA

into VGAM73 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60744] VGAM75 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM75 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM75 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM75 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60745] It is appreciated that a function of VGR4385 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4385 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4385 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4385 gene: VGAM73 host target protein and VGAM75 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM73 and VGAM75

[60746] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4386(VGR4386) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60747] VGR4386 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4386 gene was detected is described hereinabove with reference to Figs. 6-15.

[60748] VGR4386 gene encodes VGR4386 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60749] VGR4386 precursor RNA folds spatially, forming VGR4386 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4386 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4386 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60750] VGR4386 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2198 precursor RNA and VGAM2313 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60751] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2198

RNA and VGAM2313 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60752] VGAM2198 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2198 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2198 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2198 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60753] VGAM2313 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2313 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2313 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2313 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [60754] It is appreciated that a function of VGR4386 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4386 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4386 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4386 gene: VGAM2198 host target protein and VGAM2313 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2198 and VGAM2313
- [60755] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4387(VGR4387) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60756] VGR4387 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4387 gene was detected is described hereinabove with reference to Figs. 6–15.

[60757] VGR4387 gene encodes VGR4387 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60758] VGR4387 precursor RNA folds spatially, forming VGR4387 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4387 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4387 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[60759] VGR4387 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2534 precursor RNA, VGAM2535 precursor RNA, VGAM2536 precursor RNA and VGAM3658 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60760] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2534 RNA, VGAM2535 RNA, VGAM2536 RNA and VGAM3658 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60761] VGAM2534 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2534 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2534 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2534 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60762] VGAM2535 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2535 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2535 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2535 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60763] VGAM2536 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding

site located in an untranslated region of VGAM2536 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2536 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2536 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60764] VGAM3658 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3658 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3658 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3658 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60765] It is appreciated that a function of VGR4387 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4387 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4387 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4387 gene: VGAM2534 host target protein, VGAM2535 host target protein, VGAM2536 host target protein and VGAM3658 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2534, VGAM2535, VGAM2536 and VGAM3658

[60766] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4388(VGR4388) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[60767] VGR4388 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4388 gene was detected is described hereinabove with reference to Figs. 6–15.

[60768] VGR4388 gene encodes VGR4388 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60769] VGR4388 precursor RNA folds spatially, forming VGR4388 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4388 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4388 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60770] VGR4388 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM pre–

cursor RNAs, VGAM2116 precursor RNA and VGAM2117 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60771] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2116 RNA and VGAM2117 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60772] VGAM2116 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2116 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2116 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2116 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60773] VGAM2117 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2117 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2117 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2117 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60774] It is appreciated that a function of VGR4388 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4388 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4388 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4388 gene: VGAM2116 host target protein and VGAM2117 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM2116 and VGAM2117

[60775] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4389(VGR4389) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60776] VGR4389 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4389 gene was detected is described hereinabove with reference to Figs. 6-15.

[60777] VGR4389 gene encodes VGR4389 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60778] VGR4389 precursor RNA folds spatially, forming VGR4389

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4389 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4389 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60779] VGR4389 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2576 precursor RNA, VGAM2577 precursor RNA, VGAM2578 precursor RNA and VGAM3508 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60780] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM2576 RNA, VGAM2577 RNA, VGAM2578 RNA and VGAM3508 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60781] VGAM2576 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2576 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2576 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2576 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60782] VGAM2577 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2577 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2577 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2577 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60783] VGAM2578 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2578 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2578 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2578 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60784] VGAM3508 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3508 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3508 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3508 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60785] It is appreciated that a function of VGR4389 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4389 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4389 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4389 gene: VGAM2576 host target protein, VGAM2577 host target protein, VGAM2578 host target protein and VGAM3508 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is

elaborated hereinabove with reference to VGAM2576, VGAM2577, VGAM2578 and VGAM3508

[60786] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4390(VGR4390) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60787] VGR4390 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4390 gene was detected is described hereinabove with reference to Figs. 6–15.

[60788] VGR4390 gene encodes VGR4390 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60789] VGR4390 precursor RNA folds spatially, forming VGR4390 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4390 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4390 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60790] VGR4390 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3350 precursor RNA, VGAM3643 precursor RNA and VGAM3817 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60791] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3350 RNA, VGAM3643 RNA and VGAM3817 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60792] VGAM3350 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3350 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3350 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3350 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60793] VGAM3643 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3643 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3643 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3643 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[60794] VGAM3817 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3817 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3817 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3817 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60795] It is appreciated that a function of VGR4390 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4390 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4390 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4390 gene: VGAM3350

host target protein, VGAM3643 host target protein and VGAM3817 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3350, VGAM3643 and VGAM3817

[60796] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4391(VGR4391) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60797] VGR4391 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4391 gene was detected is described hereinabove with reference to Figs. 6-15.

[60798] VGR4391 gene encodes VGR4391 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60799] VGR4391 precursor RNA folds spatially, forming VGR4391

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4391 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4391 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60800] VGR4391 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3420 precursor RNA and VGAM3421 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60801] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3420 RNA and VGAM3421 RNA respectively, herein schemati-

cally represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60802] VGAM3420 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3420 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3420 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3420 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60803] VGAM3421 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3421 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3421 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM3421 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60804] It is appreciated that a function of VGR4391 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4391 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4391 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4391 gene: VGAM3420 host target protein and VGAM3421 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3420 and VGAM3421

[60805] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4392(VGR4392) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60806] VGR4392 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4392 gene was detected is described hereinabove with reference to Figs. 6–15.

[60807] VGR4392 gene encodes VGR4392 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60808] VGR4392 precursor RNA folds spatially, forming VGR4392 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4392 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4392 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60809] VGR4392 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM404 precursor RNA, VGAM405 precursor RNA, VGAM408 precursor RNA, VGAM409 precursor RNA, VGAM1558 precursor RNA, VGAM1559 precursor RNA, VGAM1561 precursor RNA and VGAM1565 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60810] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM404 RNA, VGAM405 RNA, VGAM408 RNA, VGAM409 RNA, VGAM1558 RNA, VGAM1559 RNA, VGAM1561 RNA and VGAM1565 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[60811] VGAM404 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM404 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM404 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM404 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60812] VGAM405 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM405 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM405 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM405 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60813] VGAM408 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM408 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM408 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM408 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60814] VGAM409 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM409 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM409 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM409 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60815] VGAM1558 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1558 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1558 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1558 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60816] VGAM1559 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1559 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1559 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1559 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60817] VGAM1561 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1561 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1561 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1561 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60818] VGAM1565 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1565 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1565 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1565 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60819] It is appreciated that a function of VGR4392 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4392 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4392 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4392 gene: VGAM404 host target protein, VGAM405 host target protein, VGAM408 host target protein, VGAM409 host target protein, VGAM1558 host target protein, VGAM1559 host target protein, VGAM1561 host target protein and VGAM1565 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to

VGAM404, VGAM405, VGAM408, VGAM409, VGAM1558, VGAM1559, VGAM1561 and VGAM1565

[60820] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4393(VGR4393) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60821] VGR4393 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4393 gene was detected is described hereinabove with reference to Figs. 6-15.

[60822] VGR4393 gene encodes VGR4393 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60823] VGR4393 precursor RNA folds spatially, forming VGR4393 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4393 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art

as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4393 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60824] VGR4393 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1069 precursor RNA, VGAM1544 precursor RNA, VGAM1547 precursor RNA and VGAM1548 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60825] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1069 RNA, VGAM1544 RNA, VGAM1547 RNA and VGAM1548 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA

respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60826] VGAM1069 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1069 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1069 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1069 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60827] VGAM1544 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1544 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1544 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM1544 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60828] VGAM1547 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1547 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1547 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1547 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60829] VGAM1548 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1548 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1548 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM1548 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60830] It is appreciated that a function of VGR4393 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4393 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4393 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4393 gene: VGAM1069 host target protein, VGAM1544 host target protein, VGAM1547 host target protein and VGAM1548 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1069, VGAM1544, VGAM1547 and VGAM1548

[60831] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4394(VGR4394) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60832] VGR4394 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4394 gene was detected is described hereinabove with reference to Figs. 6–15.

[60833] VGR4394 gene encodes VGR4394 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60834] VGR4394 precursor RNA folds spatially, forming VGR4394 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4394 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4394 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60835] VGR4394 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1461 precursor RNA and VGAM1463 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60836] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1461 RNA and VGAM1463 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60837] VGAM1461 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1461 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1461 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1461 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60838] VGAM1463 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1463 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1463 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1463 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60839] It is appreciated that a function of VGR4394 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4394 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4394 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4394 gene: VGAM1461 host target protein and VGAM1463 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1461 and VGAM1463

[60840] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4395(VGR4395) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60841] VGR4395 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4395 gene was detected is described hereinabove with reference to Figs.

6-15.

[60842] VGR4395 gene encodes VGR4395 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60843] VGR4395 precursor RNA folds spatially, forming VGR4395 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4395 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4395 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60844] VGR4395 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 5 separate VGAM precursor RNAs, VGAM1827 precursor RNA, VGAM1829 precursor RNA, VGAM1830 precursor RNA, VGAM2235 precursor RNA and VGAM2236 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR and

VGAM5 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60845] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1827 RNA, VGAM1829 RNA, VGAM1830 RNA, VGAM2235 RNA and VGAM2236 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA and VGAM5 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60846] VGAM1827 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1827 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1827 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1827 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60847] VGAM1829 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1829 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1829 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1829 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60848] VGAM1830 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1830 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1830 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1830 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[60849] VGAM2235 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2235 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2235 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2235 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60850] VGAM2236 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2236 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2236 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2236 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60851] It is appreciated that a function of VGR4395 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4395 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4395 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4395 gene: VGAM1827 host target protein, VGAM1829 host target protein, VGAM1830 host target protein, VGAM2235 host target protein and VGAM2236 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1827, VGAM1829, VGAM1830, VGAM2235 and VGAM2236

[60852] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4396(VGR4396) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60853] VGR4396 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4396 gene was detected is described hereinabove with reference to Figs. 6–15.

[60854] VGR4396 gene encodes VGR4396 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60855] VGR4396 precursor RNA folds spatially, forming VGR4396 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4396 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4396 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[60856] VGR4396 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3441 precursor RNA and VGAM3664 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60857] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3441 RNA and VGAM3664 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60858] VGAM3441 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3441 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3441 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3441 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60859] VGAM3664 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3664 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3664 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3664 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60860] It is appreciated that a function of VGR4396 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4396 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4396 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4396 gene: VGAM3441 host target protein and VGAM3664 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3441 and VGAM3664

[60861] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4397(VGR4397) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60862] VGR4397 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4397 gene was detected is described hereinabove with reference to Figs. 6–15.

[60863] VGR4397 gene encodes VGR4397 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60864] VGR4397 precursor RNA folds spatially, forming VGR4397 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4397 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4397 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60865] VGR4397 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2859 precursor RNA, VGAM2860 precursor RNA and VGAM3576 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig.

8.

[60866] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2859 RNA, VGAM2860 RNA and VGAM3576 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60867] VGAM2859 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2859 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2859 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2859 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60868] VGAM2860 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2860 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2860 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2860 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60869] VGAM3576 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3576 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3576 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3576 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60870] It is appreciated that a function of VGR4397 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4397 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4397 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4397 gene: VGAM2859 host target protein, VGAM2860 host target protein and VGAM3576 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2859, VGAM2860 and VGAM3576

[60871] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4398(VGR4398) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60872] VGR4398 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4398 gene was detected is described hereinabove with reference to Figs. 6–15.

[60873] VGR4398 gene encodes VGR4398 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60874] VGR4398 precursor RNA folds spatially, forming VGR4398 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4398 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4398 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60875] VGR4398 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM818 precursor RNA, VGAM819 precursor RNA and VGAM820 precursor RNA, herein schemati–

cally represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60876] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM818 RNA, VGAM819 RNA and VGAM820 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60877] VGAM818 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM818 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM818 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM818 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60878] VGAM819 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM819 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM819 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM819 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60879] VGAM820 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM820 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM820 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM820 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[60880] It is appreciated that a function of VGR4398 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4398 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4398 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4398 gene: VGAM818 host target protein, VGAM819 host target protein and VGAM820 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM818, VGAM819 and VGAM820

[60881] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4399(VGR4399) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[60882] VGR4399 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4399 gene was detected is described hereinabove with reference to Figs. 6–15.

[60883] VGR4399 gene encodes VGR4399 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60884] VGR4399 precursor RNA folds spatially, forming VGR4399 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4399 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4399 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60885] VGR4399 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM677 precursor RNA, VGAM690 precursor RNA, VGAM1453 precursor RNA, VGAM1455 precursor RNA, VGAM1456 precursor RNA, VGAM2154 precursor RNA, VGAM2159 precursor RNA and VGAM2492 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60886] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM677 RNA, VGAM690 RNA, VGAM1453 RNA, VGAM1455 RNA, VGAM1456 RNA, VGAM2154 RNA, VGAM2159 RNA and VGAM2492 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60887] VGAM677 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM677 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM677 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM677 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60888] VGAM690 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM690 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM690 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM690 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60889] VGAM1453 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1453 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1453 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1453 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60890] VGAM1455 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1455 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1455 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1455 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[60891] VGAM1456 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1456 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1456 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1456 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60892] VGAM2154 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2154 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2154 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2154 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60893] VGAM2159 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2159 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2159 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2159 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60894] VGAM2492 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2492 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2492 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM2492 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60895] It is appreciated that a function of VGR4399 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4399 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4399 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4399 gene: VGAM677 host target protein, VGAM690 host target protein, VGAM1453 host target protein, VGAM1455 host target protein, VGAM1456 host target protein, VGAM2154 host target protein, VGAM2159 host target protein and VGAM2492 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM677, VGAM690, VGAM1453, VGAM1455, VGAM1456, VGAM2154, VGAM2159 and VGAM2492

[60896] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4400(VGR4400) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60897] VGR4400 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4400 gene was detected is described hereinabove with reference to Figs. 6–15.

[60898] VGR4400 gene encodes VGR4400 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60899] VGR4400 precursor RNA folds spatially, forming VGR4400 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4400 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4400 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60900] VGR4400 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2493 precursor RNA, VGAM2636 precursor RNA, VGAM2854 precursor RNA, VGAM2855 precursor RNA, VGAM3253 precursor RNA, VGAM3574 precursor RNA, VGAM3642 precursor RNA and VGAM3699 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60901] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2493 RNA, VGAM2636 RNA, VGAM2854 RNA, VGAM2855 RNA, VGAM3253 RNA, VGAM3574 RNA, VGAM3642 RNA and

VGAM3699 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60902] VGAM2493 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2493 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2493 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2493 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60903] VGAM2636 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2636 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2636 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2636 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60904] VGAM2854 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2854 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2854 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2854 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60905] VGAM2855 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2855 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2855 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2855 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60906] VGAM3253 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3253 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3253 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3253 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60907] VGAM3574 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3574 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3574 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3574 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60908] VGAM3642 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3642 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3642 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3642 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60909] VGAM3699 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3699 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3699 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3699 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60910] It is appreciated that a function of VGR4400 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4400 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4400 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4400 gene: VGAM2493 host target protein, VGAM2636 host target protein, VGAM2854 host target protein, VGAM2855 host target protein, VGAM3253 host target protein, VGAM3574 host target protein, VGAM3642 host target protein and

VGAM3699 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2493, VGAM2636, VGAM2854, VGAM2855, VGAM3253, VGAM3574, VGAM3642 and VGAM3699

[60911] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4401(VGR4401) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60912] VGR4401 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4401 gene was detected is described hereinabove with reference to Figs. 6-15.

[60913] VGR4401 gene encodes VGR4401 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60914] VGR4401 precursor RNA folds spatially, forming VGR4401 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4401 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4401 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60915] VGR4401 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM572 precursor RNA, VGAM573 precursor RNA, VGAM575 precursor RNA, VGAM606 precursor RNA, VGAM2153 precursor RNA, VGAM2157 precursor RNA, VGAM2158 precursor RNA and VGAM2650 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a

hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60916] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM572 RNA, VGAM573 RNA, VGAM575 RNA, VGAM606 RNA, VGAM2153 RNA, VGAM2157 RNA, VGAM2158 RNA and VGAM2650 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60917] VGAM572 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM572 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM572 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM572 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[60918] VGAM573 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM573 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM573 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM573 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60919] VGAM575 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM575 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM575 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM575 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60920] VGAM606 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM606 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM606 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM606 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60921] VGAM2153 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2153 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2153 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM2153 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60922] VGAM2157 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2157 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2157 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2157 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60923] VGAM2158 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2158 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2158 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM2158 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60924] VGAM2650 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2650 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2650 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2650 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60925] It is appreciated that a function of VGR4401 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4401 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4401 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4401 gene: VGAM572 host target protein, VGAM573 host target protein, VGAM575 host target protein, VGAM606 host target protein, VGAM2153 host target protein, VGAM2157 host target protein, VGAM2158 host target protein and VGAM2650 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM572, VGAM573, VGAM575, VGAM606, VGAM2153, VGAM2157, VGAM2158 and VGAM2650

[60926] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4402(VGR4402) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60927] VGR4402 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4402 gene was detected is described hereinabove with reference to Figs. 6–15.

[60928] VGR4402 gene encodes VGR4402 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60929] VGR4402 precursor RNA folds spatially, forming VGR4402 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4402 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4402 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60930] VGR4402 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3254 precursor RNA, VGAM3485 precursor RNA, VGAM3523 precursor RNA, VGAM3533 precursor RNA, VGAM3534 precursor RNA, VGAM3558 pre–

cursor RNA, VGAM3565 precursor RNA and VGAM3612 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60931] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3254 RNA, VGAM3485 RNA, VGAM3523 RNA, VGAM3533 RNA, VGAM3534 RNA, VGAM3558 RNA, VGAM3565 RNA and VGAM3612 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60932] VGAM3254 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3254 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3254 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3254 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60933] VGAM3485 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3485 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3485 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3485 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60934] VGAM3523 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3523 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3523 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3523 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60935] VGAM3533 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3533 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3533 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3533 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60936] VGAM3534 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3534 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3534 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3534 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60937] VGAM3558 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3558 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3558 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3558 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60938] VGAM3565 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM3565 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3565 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3565 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60939] VGAM3612 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3612 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3612 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3612 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60940] It is appreciated that a function of VGR4402 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4402 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4402 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4402 gene: VGAM3254 host target protein, VGAM3485 host target protein, VGAM3523 host target protein, VGAM3533 host target protein, VGAM3534 host target protein, VGAM3558 host target protein, VGAM3565 host target protein and VGAM3612 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3254, VGAM3485, VGAM3523, VGAM3533, VGAM3534, VGAM3558, VGAM3565 and VGAM3612

[60941] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4403(VGR4403) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60942] VGR4403 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4403 gene was detected is described hereinabove with reference to Figs. 6–15.

[60943] VGR4403 gene encodes VGR4403 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60944] VGR4403 precursor RNA folds spatially, forming VGR4403 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4403 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4403 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[60945] VGR4403 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3687 precursor RNA and VGAM3759 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60946] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3687 RNA and VGAM3759 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60947] VGAM3687 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3687 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3687 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3687 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60948] VGAM3759 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3759 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3759 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3759 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60949] It is appreciated that a function of VGR4403 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4403 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4403 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4403 gene: VGAM3687 host target protein and VGAM3759 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3687 and VGAM3759

[60950] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4404(VGR4404) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60951] VGR4404 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4404 gene was detected is described hereinabove with reference to Figs. 6-15.

[60952] VGR4404 gene encodes VGR4404 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60953] VGR4404 precursor RNA folds spatially, forming VGR4404 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4404 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4404 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60954] VGR4404 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM355 precursor RNA, VGAM476 precursor RNA, VGAM597 precursor RNA, VGAM598 precursor RNA, VGAM1052 precursor RNA, VGAM1362 precursor RNA, VGAM1363 precursor RNA and VGAM1364 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR,

VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60955] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM355 RNA, VGAM476 RNA, VGAM597 RNA, VGAM598 RNA, VGAM1052 RNA, VGAM1362 RNA, VGAM1363 RNA and VGAM1364 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60956] VGAM355 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM355 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM355 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM355 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60957] VGAM476 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM476 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM476 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM476 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60958] VGAM597 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM597 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM597 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM597 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60959] VGAM598 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM598 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM598 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM598 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60960] VGAM1052 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1052 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1052 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1052 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60961] VGAM1362 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1362 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1362 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1362 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60962] VGAM1363 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1363 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1363 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1363 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60963] VGAM1364 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1364 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1364 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1364 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60964] It is appreciated that a function of VGR4404 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4404 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4404 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4404 gene: VGAM355 host target protein, VGAM476 host target protein, VGAM597 host target protein, VGAM598 host target protein, VGAM1052 host target protein, VGAM1362 host target protein, VGAM1363 host target protein and VGAM1364 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM355, VGAM476, VGAM597, VGAM598, VGAM1052, VGAM1362, VGAM1363 and VGAM1364

[60965] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4405(VGR4405) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[60966] VGR4405 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4405 gene was detected is described hereinabove with reference to Figs. 6–15.

[60967] VGR4405 gene encodes VGR4405 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60968] VGR4405 precursor RNA folds spatially, forming VGR4405 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4405 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4405 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[60969] VGR4405 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM1367 precursor RNA, VGAM1472 precursor RNA, VGAM1694 precursor RNA, VGAM1696 precursor RNA, VGAM1701 precursor RNA, VGAM2011 precursor RNA, VGAM2012 precursor RNA and VGAM2160 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60970] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1367 RNA, VGAM1472 RNA, VGAM1694 RNA, VGAM1696 RNA, VGAM1701 RNA, VGAM2011 RNA, VGAM2012 RNA and VGAM2160 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60971] VGAM1367 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM1367 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1367 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1367 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60972] VGAM1472 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1472 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1472 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1472 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60973] VGAM1694 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1694 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1694 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1694 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60974] VGAM1696 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1696 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1696 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1696 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60975] VGAM1701 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1701 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1701 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1701 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60976] VGAM2011 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2011 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2011 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2011 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[60977] VGAM2012 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2012 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2012 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2012 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60978] VGAM2160 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2160 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2160 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2160 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60979] It is appreciated that a function of VGR4405 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4405 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4405 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4405 gene: VGAM1367 host target protein, VGAM1472 host target protein, VGAM1694 host target protein, VGAM1696 host target protein, VGAM1701 host target protein, VGAM2011 host target protein, VGAM2012 host target protein and VGAM2160 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1367, VGAM1472, VGAM1694, VGAM1696, VGAM1701, VGAM2011, VGAM2012 and VGAM2160

[60980] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4406(VGR4406) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60981] VGR4406 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4406 gene was detected is described hereinabove with reference to Figs. 6–15.

[60982] VGR4406 gene encodes VGR4406 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60983] VGR4406 precursor RNA folds spatially, forming VGR4406 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4406 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4406 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60984] VGR4406 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2228 precursor RNA, VGAM2285 precursor RNA, VGAM2286 precursor RNA, VGAM2369 precursor RNA, VGAM2370 precursor RNA, VGAM2799 precursor RNA, VGAM2861 precursor RNA and VGAM2874 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[60985] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2228 RNA, VGAM2285 RNA, VGAM2286 RNA, VGAM2369 RNA, VGAM2370 RNA, VGAM2799 RNA, VGAM2861 RNA and

VGAM2874 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[60986] VGAM2228 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2228 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2228 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2228 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[60987] VGAM2285 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2285 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2285 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2285 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[60988] VGAM2286 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2286 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2286 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2286 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[60989] VGAM2369 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2369 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2369 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2369 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[60990] VGAM2370 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2370 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2370 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2370 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[60991] VGAM2799 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2799 host target RNA, herein schematically represented by VGAM6

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2799 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2799 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[60992] VGAM2861 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2861 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2861 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2861 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[60993] VGAM2874 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2874 host

target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2874 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2874 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[60994] It is appreciated that a function of VGR4406 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4406 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4406 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4406 gene: VGAM2228 host target protein, VGAM2285 host target protein, VGAM2286 host target protein, VGAM2369 host target protein, VGAM2370 host target protein, VGAM2799 host target protein, VGAM2861 host target protein and

VGAM2874 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2228, VGAM2285, VGAM2286, VGAM2369, VGAM2370, VGAM2799, VGAM2861 and VGAM2874

[60995] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4407(VGR4407) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[60996] VGR4407 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4407 gene was detected is described hereinabove with reference to Figs. 6-15.

[60997] VGR4407 gene encodes VGR4407 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[60998] VGR4407 precursor RNA folds spatially, forming VGR4407 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4407 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4407 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[60999] VGR4407 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2875 precursor RNA, VGAM3229 precursor RNA, VGAM3329 precursor RNA, VGAM3446 precursor RNA, VGAM3657 precursor RNA, VGAM3671 precursor RNA, VGAM3726 precursor RNA and VGAM3793 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61000] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2875 RNA, VGAM3229 RNA, VGAM3329 RNA, VGAM3446 RNA, VGAM3657 RNA, VGAM3671 RNA, VGAM3726 RNA and VGAM3793 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61001] VGAM2875 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2875 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2875 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2875 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[61002] VGAM3229 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3229 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3229 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3229 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61003] VGAM3329 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3329 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3329 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3329 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61004] VGAM3446 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3446 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3446 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3446 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61005] VGAM3657 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3657 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3657 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM3657 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61006] VGAM3671 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3671 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3671 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3671 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61007] VGAM3726 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3726 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3726 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM3726 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61008] VGAM3793 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3793 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3793 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3793 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61009] It is appreciated that a function of VGR4407 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4407 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4407 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4407 gene: VGAM2875 host target protein, VGAM3229 host target protein, VGAM3329 host target protein, VGAM3446 host target protein, VGAM3657 host target protein, VGAM3671 host target protein, VGAM3726 host target protein and VGAM3793 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2875, VGAM3229, VGAM3329, VGAM3446, VGAM3657, VGAM3671, VGAM3726 and VGAM3793

[61010] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4408(VGR4408) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61011] VGR4408 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4408 gene was detected is described hereinabove with reference to Figs. 6–15.

[61012] VGR4408 gene encodes VGR4408 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61013] VGR4408 precursor RNA folds spatially, forming VGR4408 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4408 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4408 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61014] VGR4408 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2848 precursor RNA, VGAM3455 precursor RNA and VGAM3513 precursor RNA, herein

schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61015] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2848 RNA, VGAM3455 RNA and VGAM3513 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61016] VGAM2848 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2848 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2848 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2848 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[61017] VGAM3455 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3455 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3455 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3455 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61018] VGAM3513 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3513 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3513 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3513 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61019] It is appreciated that a function of VGR4408 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4408 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4408 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4408 gene: VGAM2848 host target protein, VGAM3455 host target protein and VGAM3513 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2848, VGAM3455 and VGAM3513

[61020] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4409(VGR4409) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61021] VGR4409 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4409 gene was detected is described hereinabove with reference to Figs. 6–15.

[61022] VGR4409 gene encodes VGR4409 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61023] VGR4409 precursor RNA folds spatially, forming VGR4409 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4409 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4409 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61024] VGR4409 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM2404 precursor RNA and VGAM2405 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61025] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2404 RNA and VGAM2405 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61026] VGAM2404 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2404 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2404 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2404 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61027] VGAM2405 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2405 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2405 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2405 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61028] It is appreciated that a function of VGR4409 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4409 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4409 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4409 gene: VGAM2404 host target protein and VGAM2405 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2404 and VGAM2405

[61029] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4410(VGR4410) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61030] VGR4410 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4410 gene was detected is described hereinabove with reference to Figs. 6–15.

[61031] VGR4410 gene encodes VGR4410 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[61032] VGR4410 precursor RNA folds spatially, forming VGR4410 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4410 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4410 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61033] VGR4410 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3334 precursor RNA and VGAM3335 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61034] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM3334 RNA and VGAM3335 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61035] VGAM3334 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3334 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3334 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3334 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61036] VGAM3335 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3335 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3335 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3335 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61037] It is appreciated that a function of VGR4410 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4410 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4410 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4410 gene: VGAM3334 host target protein and VGAM3335 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3334 and VGAM3335

[61038] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4411(VGR4411) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61039] VGR4411 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4411 gene was detected is described hereinabove with reference to Figs. 6-15.

[61040] VGR4411 gene encodes VGR4411 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61041] VGR4411 precursor RNA folds spatially, forming VGR4411 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4411 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4411 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61042] VGR4411 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM1519 precursor RNA and VGAM1520 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61043] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1519 RNA and VGAM1520 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61044] VGAM1519 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1519 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1519 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1519 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61045] VGAM1520 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1520 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1520 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1520 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61046] It is appreciated that a function of VGR4411 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4411 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4411 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4411 gene: VGAM1519 host target protein and VGAM1520 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1519 and VGAM1520

[61047] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4412(VGR4412) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61048] VGR4412 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4412 gene was detected is described hereinabove with reference to Figs.

6-15.

[61049] VGR4412 gene encodes VGR4412 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61050] VGR4412 precursor RNA folds spatially, forming VGR4412 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4412 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4412 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61051] VGR4412 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM233 precursor RNA, VGAM238 precursor RNA, VGAM246 precursor RNA, VGAM248 precursor RNA, VGAM252 precursor RNA, VGAM253 precursor RNA, VGAM3141 precursor RNA and VGAM3242 precursor RNA, herein schematically represented by VGAM1 PRECURSOR,

VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61052] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM233 RNA, VGAM238 RNA, VGAM246 RNA, VGAM248 RNA, VGAM252 RNA, VGAM253 RNA, VGAM3141 RNA and VGAM3242 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61053] VGAM233 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM233 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM233 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM233 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61054] VGAM238 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM238 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM238 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM238 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61055] VGAM246 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM246 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM246 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM246 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61056] VGAM248 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM248 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM248 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM248 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61057] VGAM252 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM252 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM252 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM252 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61058] VGAM253 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM253 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM253 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM253 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61059] VGAM3141 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3141 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3141 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3141 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61060] VGAM3242 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3242 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3242 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3242 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61061] It is appreciated that a function of VGR4412 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4412 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4412 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4412 gene: VGAM233 host target protein, VGAM238 host target protein, VGAM246 host target protein, VGAM248 host target protein, VGAM252 host target protein, VGAM253 host target protein, VGAM3141 host target protein and VGAM3242 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM233, VGAM238, VGAM246, VGAM248, VGAM252, VGAM253, VGAM3141 and VGAM3242

[61062] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4413(VGR4413) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[61063] VGR4413 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4413 gene was detected is described hereinabove with reference to Figs. 6–15.

[61064] VGR4413 gene encodes VGR4413 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61065] VGR4413 precursor RNA folds spatially, forming VGR4413 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4413 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4413 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61066] VGR4413 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2489 precursor RNA, VGAM2490 precursor RNA, VGAM2491 precursor RNA and VGAM3177 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61067] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2489 RNA, VGAM2490 RNA, VGAM2491 RNA and VGAM3177 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61068] VGAM2489 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2489 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2489 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2489 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61069] VGAM2490 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2490 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2490 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2490 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61070] VGAM2491 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2491 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2491 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2491 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61071] VGAM3177 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3177 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3177 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3177 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61072] It is appreciated that a function of VGR4413 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4413 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4413 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4413 gene: VGAM2489 host target protein, VGAM2490 host target protein, VGAM2491 host target protein and VGAM3177 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2489, VGAM2490, VGAM2491 and VGAM3177

[61073] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4414(VGR4414) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61074] VGR4414 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4414 gene was detected is described hereinabove with reference to Figs. 6–15.

[61075] VGR4414 gene encodes VGR4414 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61076] VGR4414 precursor RNA folds spatially, forming VGR4414 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4414 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4414 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61077] VGR4414 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3004 precursor RNA, VGAM3684 precursor RNA and VGAM3691 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2

PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61078] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3004 RNA, VGAM3684 RNA and VGAM3691 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61079] VGAM3004 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3004 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3004 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3004 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61080] VGAM3684 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3684 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3684 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3684 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61081] VGAM3691 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3691 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3691 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3691 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[61082] It is appreciated that a function of VGR4414 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4414 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4414 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4414 gene: VGAM3004 host target protein, VGAM3684 host target protein and VGAM3691 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3004, VGAM3684 and VGAM3691

[61083] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4415(VGR4415) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[61084] VGR4415 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4415 gene was detected is described hereinabove with reference to Figs. 6–15.

[61085] VGR4415 gene encodes VGR4415 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61086] VGR4415 precursor RNA folds spatially, forming VGR4415 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4415 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4415 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61087] VGR4415 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM684 precursor RNA, VGAM685 precursor RNA, VGAM687 precursor RNA and VGAM688 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61088] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM684 RNA, VGAM685 RNA, VGAM687 RNA and VGAM688 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61089] VGAM684 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM684 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM684 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM684 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61090] VGAM685 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM685 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM685 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM685 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61091] VGAM687 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM687 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM687 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM687 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61092] VGAM688 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM688 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM688 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM688 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61093] It is appreciated that a function of VGR4415 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4415 gene include diagnosis, prevention and treatment of viral infection by .

Specific functions, and accordingly utilities, of VGR4415 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4415 gene: VGAM684 host target protein, VGAM685 host target protein, VGAM687 host target protein and VGAM688 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM684, VGAM685, VGAM687 and VGAM688

[61094] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4416(VGR4416) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61095] VGR4416 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4416 gene was

detected is described hereinabove with reference to Figs. 6–15.

[61096] VGR4416 gene encodes VGR4416 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61097] VGR4416 precursor RNA folds spatially, forming VGR4416 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4416 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4416 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61098] VGR4416 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM222 precursor RNA, VGAM225 precursor RNA, VGAM228 precursor RNA, VGAM232 precursor RNA, VGAM234 precursor RNA, VGAM235 precursor RNA, VGAM249 precursor RNA and VGAM444 precursor RNA,

herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61099] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM222 RNA, VGAM225 RNA, VGAM228 RNA, VGAM232 RNA, VGAM234 RNA, VGAM235 RNA, VGAM249 RNA and VGAM444 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61100] VGAM222 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM222 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM222 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM222 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61101] VGAM225 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM225 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM225 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM225 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61102] VGAM228 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM228 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM228 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM228 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61103] VGAM232 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM232 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM232 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM232 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61104] VGAM234 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM234 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM234 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM234 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61105] VGAM235 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM235 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM235 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM235 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61106] VGAM249 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM249 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM249 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM249 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61107] VGAM444 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM444 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM444 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM444 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61108] It is appreciated that a function of VGR4416 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4416 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4416 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4416 gene: VGAM222 host target protein, VGAM225 host target protein, VGAM228 host target protein, VGAM232 host target protein, VGAM234 host target protein, VGAM235 host target protein, VGAM249 host target protein and VGAM444 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM222, VGAM225, VGAM228, VGAM232, VGAM234, VGAM235, VGAM249 and VGAM444

[61109] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4417(VGR4417) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates

expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61110] VGR4417 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4417 gene was detected is described hereinabove with reference to Figs. 6–15.

[61111] VGR4417 gene encodes VGR4417 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61112] VGR4417 precursor RNA folds spatially, forming VGR4417 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4417 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4417 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61113] VGR4417 folded precursor RNA, herein designated VGR

FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM445 precursor RNA, VGAM448 precursor RNA, VGAM449 precursor RNA, VGAM846 precursor RNA, VGAM847 precursor RNA, VGAM848 precursor RNA, VGAM858 precursor RNA and VGAM860 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61114] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM445 RNA, VGAM448 RNA, VGAM449 RNA, VGAM846 RNA, VGAM847 RNA, VGAM848 RNA, VGAM858 RNA and VGAM860 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61115] VGAM445 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM445 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM445 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM445 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61116] VGAM448 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM448 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM448 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM448 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[61117] VGAM449 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM449 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM449 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM449 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61118] VGAM846 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM846 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM846 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM846 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61119] VGAM847 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM847 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM847 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM847 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61120] VGAM848 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM848 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM848 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM848 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61121] VGAM858 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM858 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM858 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM858 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61122] VGAM860 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM860 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM860 host target RNA, herein

schematically represented by VGAM8 HOST TARGET RNA into VGAM860 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61123] It is appreciated that a function of VGR4417 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4417 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4417 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4417 gene: VGAM445 host target protein, VGAM448 host target protein, VGAM449 host target protein, VGAM846 host target protein, VGAM847 host target protein, VGAM848 host target protein, VGAM858 host target protein and VGAM860 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM445, VGAM448, VGAM449, VGAM846, VGAM847,

VGAM848, VGAM858 and VGAM860

[61124] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4418(VGR4418) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61125] VGR4418 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4418 gene was detected is described hereinabove with reference to Figs. 6–15.

[61126] VGR4418 gene encodes VGR4418 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61127] VGR4418 precursor RNA folds spatially, forming VGR4418 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4418 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4418 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61128] VGR4418 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM874 precursor RNA, VGAM875 precursor RNA, VGAM876 precursor RNA, VGAM910 precursor RNA, VGAM933 precursor RNA, VGAM955 precursor RNA, VGAM956 precursor RNA and VGAM1056 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61129] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM874 RNA, VGAM875 RNA, VGAM876 RNA, VGAM910 RNA,

VGAM933 RNA, VGAM955 RNA, VGAM956 RNA and VGAM1056 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61130] VGAM874 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM874 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM874 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM874 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61131] VGAM875 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM875 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM875 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM875 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61132] VGAM876 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM876 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM876 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM876 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61133] VGAM910 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM910 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM910 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM910 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61134] VGAM933 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM933 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM933 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM933 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61135] VGAM955 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM955 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM955 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM955 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61136] VGAM956 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM956 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM956 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM956 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61137] VGAM1056 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM1056 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1056 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1056 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61138] It is appreciated that a function of VGR4418 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4418 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4418 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4418 gene: VGAM874 host target protein, VGAM875 host target protein, VGAM876 host target protein, VGAM910 host target protein, VGAM933 host target protein, VGAM955 host target pro-

tein, VGAM956 host target protein and VGAM1056 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM874, VGAM875, VGAM876, VGAM910, VGAM933, VGAM955, VGAM956 and VGAM1056

[61139] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4419(VGR4419) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61140] VGR4419 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4419 gene was detected is described hereinabove with reference to Figs. 6-15.

[61141] VGR4419 gene encodes VGR4419 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61142] VGR4419 precursor RNA folds spatially, forming VGR4419 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4419 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4419 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61143] VGR4419 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1057 precursor RNA, VGAM1062 precursor RNA, VGAM1075 precursor RNA, VGAM1077 precursor RNA, VGAM1080 precursor RNA, VGAM1175 precursor RNA, VGAM1177 precursor RNA and VGAM1178 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs

being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61144] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1057 RNA, VGAM1062 RNA, VGAM1075 RNA, VGAM1077 RNA, VGAM1080 RNA, VGAM1175 RNA, VGAM1177 RNA and VGAM1178 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61145] VGAM1057 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1057 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1057 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1057 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[61146] VGAM1062 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1062 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1062 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1062 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61147] VGAM1075 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1075 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1075 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1075 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61148] VGAM1077 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1077 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1077 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1077 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61149] VGAM1080 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1080 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1080 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM1080 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61150] VGAM1175 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1175 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1175 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1175 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61151] VGAM1177 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1177 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1177 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM1177 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61152] VGAM1178 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1178 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1178 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1178 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61153] It is appreciated that a function of VGR4419 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4419 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4419 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4419 gene: VGAM1057 host target protein, VGAM1062 host target protein, VGAM1075 host target protein, VGAM1077 host target protein, VGAM1080 host target protein, VGAM1175 host target protein, VGAM1177 host target protein and VGAM1178 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1057, VGAM1062, VGAM1075, VGAM1077, VGAM1080, VGAM1175, VGAM1177 and VGAM1178

[61154] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4420(VGR4420) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61155] VGR4420 gene, herein designated VGR GENE, is a novel

bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4420 gene was detected is described hereinabove with reference to Figs. 6–15.

[61156] VGR4420 gene encodes VGR4420 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61157] VGR4420 precursor RNA folds spatially, forming VGR4420 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4420 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4420 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61158] VGR4420 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1179 precursor RNA, VGAM1180 precursor RNA, VGAM1183 precursor RNA, VGAM1184 pre–

cursor RNA, VGAM1185 precursor RNA, VGAM1368 precursor RNA, VGAM1373 precursor RNA and VGAM1375 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61159] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1179 RNA, VGAM1180 RNA, VGAM1183 RNA, VGAM1184 RNA, VGAM1185 RNA, VGAM1368 RNA, VGAM1373 RNA and VGAM1375 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61160] VGAM1179 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1179 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1179 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1179 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61161] VGAM1180 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1180 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1180 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1180 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61162] VGAM1183 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1183 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1183 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1183 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61163] VGAM1184 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1184 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1184 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1184 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61164] VGAM1185 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1185 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1185 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1185 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of

Fig. 1.

[61165] VGAM1368 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1368 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1368 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1368 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61166] VGAM1373 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1373 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1373 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1373 host target protein, herein schematically

represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61167] VGAM1375 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1375 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1375 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1375 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61168] It is appreciated that a function of VGR4420 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4420 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4420 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4420 gene: VGAM1179 host target protein, VGAM1180 host target protein, VGAM1183 host target protein, VGAM1184 host target protein, VGAM1185 host target protein, VGAM1368 host target protein, VGAM1373 host target protein and VGAM1375 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1179, VGAM1180, VGAM1183, VGAM1184, VGAM1185, VGAM1368, VGAM1373 and VGAM1375

[61169] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4421(VGR4421) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61170] VGR4421 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4421 gene was

detected is described hereinabove with reference to Figs. 6–15.

[61171] VGR4421 gene encodes VGR4421 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61172] VGR4421 precursor RNA folds spatially, forming VGR4421 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4421 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4421 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61173] VGR4421 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1376 precursor RNA, VGAM1379 precursor RNA, VGAM1381 precursor RNA, VGAM1382 precursor RNA, VGAM1385 precursor RNA, VGAM1502 precursor RNA, VGAM1503 precursor RNA and VGAM1504

precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61174] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1376 RNA, VGAM1379 RNA, VGAM1381 RNA, VGAM1382 RNA, VGAM1385 RNA, VGAM1502 RNA, VGAM1503 RNA and VGAM1504 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61175] VGAM1376 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1376 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1376 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1376 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61176] VGAM1379 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1379 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1379 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1379 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61177] VGAM1381 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1381 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1381 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1381 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61178] VGAM1382 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1382 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1382 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1382 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61179] VGAM1385 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1385 host target RNA, herein schematically represented by VGAM5

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1385 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1385 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61180] VGAM1502 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1502 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1502 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1502 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61181] VGAM1503 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1503 host

target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1503 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1503 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61182] VGAM1504 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1504 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1504 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1504 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61183] It is appreciated that a function of VGR4421 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4421 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4421 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4421 gene: VGAM1376 host target protein, VGAM1379 host target protein, VGAM1381 host target protein, VGAM1382 host target protein, VGAM1385 host target protein, VGAM1502 host target protein, VGAM1503 host target protein and VGAM1504 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1376, VGAM1379, VGAM1381, VGAM1382, VGAM1385, VGAM1502, VGAM1503 and VGAM1504

[61184] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4422(VGR4422) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61185] VGR4422 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4422 gene was detected is described hereinabove with reference to Figs. 6–15.

[61186] VGR4422 gene encodes VGR4422 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61187] VGR4422 precursor RNA folds spatially, forming VGR4422 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4422 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4422 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61188] VGR4422 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1706 precursor RNA, VGAM1708 precursor RNA, VGAM1739 precursor RNA, VGAM1746 precursor RNA, VGAM1816 precursor RNA, VGAM1818 precursor RNA, VGAM1822 precursor RNA and VGAM1823 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61189] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1706 RNA, VGAM1708 RNA, VGAM1739 RNA, VGAM1746 RNA, VGAM1816 RNA, VGAM1818 RNA, VGAM1822 RNA and VGAM1823 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[61190] VGAM1706 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1706 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1706 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1706 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61191] VGAM1708 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1708 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1708 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1708 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61192] VGAM1739 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1739 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1739 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1739 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61193] VGAM1746 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1746 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1746 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM1746 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61194] VGAM1816 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1816 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1816 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1816 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61195] VGAM1818 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1818 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1818 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1818 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61196] VGAM1822 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1822 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1822 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1822 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61197] VGAM1823 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1823 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1823 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1823 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61198] It is appreciated that a function of VGR4422 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4422 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4422 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4422 gene: VGAM1706 host target protein, VGAM1708 host target protein, VGAM1739 host target protein, VGAM1746 host target protein, VGAM1816 host target protein, VGAM1818 host target protein, VGAM1822 host target protein and VGAM1823 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM1706, VGAM1708, VGAM1739, VGAM1746, VGAM1816, VGAM1818, VGAM1822 and VGAM1823

[61199] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4423(VGR4423) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61200] VGR4423 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4423 gene was detected is described hereinabove with reference to Figs. 6-15.

[61201] VGR4423 gene encodes VGR4423 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61202] VGR4423 precursor RNA folds spatially, forming VGR4423 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4423 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4423 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61203] VGR4423 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1920 precursor RNA, VGAM1923 precursor RNA, VGAM1925 precursor RNA, VGAM1995 precursor RNA, VGAM1996 precursor RNA, VGAM2040 precursor RNA, VGAM2041 precursor RNA and VGAM2042 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61204] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM1920 RNA, VGAM1923 RNA, VGAM1925 RNA, VGAM1995 RNA, VGAM1996 RNA, VGAM2040 RNA, VGAM2041 RNA and VGAM2042 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61205] VGAM1920 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1920 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1920 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1920 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61206] VGAM1923 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1923 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1923 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1923 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61207] VGAM1925 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1925 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1925 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1925 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61208] VGAM1995 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM1995 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1995 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1995 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61209] VGAM1996 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1996 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1996 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1996 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61210] VGAM2040 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2040 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2040 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2040 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61211] VGAM2041 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2041 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2041 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2041 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61212] VGAM2042 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2042 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2042 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2042 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61213] It is appreciated that a function of VGR4423 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4423 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4423 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4423 gene: VGAM1920 host target protein, VGAM1923 host target protein,

VGAM1925 host target protein, VGAM1995 host target protein, VGAM1996 host target protein, VGAM2040 host target protein, VGAM2041 host target protein and VGAM2042 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1920, VGAM1923, VGAM1925, VGAM1995, VGAM1996, VGAM2040, VGAM2041 and VGAM2042

[61214] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4424(VGR4424) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61215] VGR4424 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4424 gene was detected is described hereinabove with reference to Figs. 6–15.

- [61216] VGR4424 gene encodes VGR4424 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.
- [61217] VGR4424 precursor RNA folds spatially, forming VGR4424 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4424 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4424 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.
- [61218] VGR4424 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2311 precursor RNA, VGAM2312 precursor RNA, VGAM2502 precursor RNA, VGAM2761 precursor RNA, VGAM2762 precursor RNA, VGAM2763 precursor RNA, VGAM2849 precursor RNA and VGAM2901 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61219] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2311 RNA, VGAM2312 RNA, VGAM2502 RNA, VGAM2761 RNA, VGAM2762 RNA, VGAM2763 RNA, VGAM2849 RNA and VGAM2901 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61220] VGAM2311 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2311 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2311 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2311 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61221] VGAM2312 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2312 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2312 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2312 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61222] VGAM2502 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2502 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2502 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2502 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61223] VGAM2761 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2761 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2761 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2761 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61224] VGAM2762 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2762 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2762 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2762 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61225] VGAM2763 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2763 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2763 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2763 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61226] VGAM2849 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2849 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2849 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2849 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61227] VGAM2901 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2901 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2901 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2901 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61228] It is appreciated that a function of VGR4424 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4424 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4424 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4424 gene: VGAM2311 host target protein, VGAM2312 host target protein, VGAM2502 host target protein, VGAM2761 host target protein, VGAM2762 host target protein, VGAM2763 host target protein, VGAM2849 host target protein and VGAM2901 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2311, VGAM2312, VGAM2502, VGAM2761, VGAM2762, VGAM2763, VGAM2849 and VGAM2901

[61229] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4425(VGR4425) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[61230] VGR4425 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4425 gene was detected is described hereinabove with reference to Figs. 6–15.

[61231] VGR4425 gene encodes VGR4425 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61232] VGR4425 precursor RNA folds spatially, forming VGR4425 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4425 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4425 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61233] VGR4425 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2930 precursor RNA, VGAM2961 precursor RNA, VGAM2962 precursor RNA, VGAM2985 precursor RNA, VGAM3059 precursor RNA, VGAM3082 precursor RNA, VGAM3083 precursor RNA and VGAM3084 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61234] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2930 RNA, VGAM2961 RNA, VGAM2962 RNA, VGAM2985 RNA, VGAM3059 RNA, VGAM3082 RNA, VGAM3083 RNA and VGAM3084 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61235] VGAM2930 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2930 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2930 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2930 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61236] VGAM2961 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2961 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2961 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2961 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61237] VGAM2962 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2962 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2962 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2962 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61238] VGAM2985 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2985 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2985 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2985 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[61239] VGAM3059 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3059 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3059 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3059 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61240] VGAM3082 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3082 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3082 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3082 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61241] VGAM3083 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3083 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3083 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3083 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61242] VGAM3084 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3084 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3084 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM3084 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61243] It is appreciated that a function of VGR4425 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4425 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4425 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4425 gene: VGAM2930 host target protein, VGAM2961 host target protein, VGAM2962 host target protein, VGAM2985 host target protein, VGAM3059 host target protein, VGAM3082 host target protein, VGAM3083 host target protein and VGAM3084 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2930, VGAM2961, VGAM2962, VGAM2985, VGAM3059, VGAM3082, VGAM3083 and

VGAM3084

[61244] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4426(VGR4426) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61245] VGR4426 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4426 gene was detected is described hereinabove with reference to Figs. 6–15.

[61246] VGR4426 gene encodes VGR4426 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61247] VGR4426 precursor RNA folds spatially, forming VGR4426 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4426 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4426 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61248] VGR4426 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3104 precursor RNA, VGAM3178 precursor RNA, VGAM3185 precursor RNA, VGAM3186 precursor RNA, VGAM3187 precursor RNA, VGAM3252 precursor RNA, VGAM3310 precursor RNA and VGAM3311 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61249] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3104 RNA, VGAM3178 RNA, VGAM3185 RNA, VGAM3186 RNA,

VGAM3187 RNA, VGAM3252 RNA, VGAM3310 RNA and VGAM3311 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61250] VGAM3104 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3104 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3104 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3104 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61251] VGAM3178 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3178 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3178 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3178 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61252] VGAM3185 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3185 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3185 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3185 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61253] VGAM3186 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3186 host target RNA, herein schematically represented by VGAM4

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3186 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3186 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61254] VGAM3187 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3187 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3187 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3187 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61255] VGAM3252 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3252 host

target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3252 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3252 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61256] VGAM3310 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3310 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3310 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3310 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61257] VGAM3311 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding

site located in an untranslated region of VGAM3311 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3311 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3311 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61258] It is appreciated that a function of VGR4426 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4426 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4426 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4426 gene: VGAM3104 host target protein, VGAM3178 host target protein, VGAM3185 host target protein, VGAM3186 host target protein, VGAM3187 host target protein, VGAM3252 host

target protein, VGAM3310 host target protein and VGAM3311 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3104, VGAM3178, VGAM3185, VGAM3186, VGAM3187, VGAM3252, VGAM3310 and VGAM3311

[61259] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4427(VGR4427) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61260] VGR4427 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4427 gene was detected is described hereinabove with reference to Figs. 6–15.

[61261] VGR4427 gene encodes VGR4427 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typi-

cally several hundred nucleotides long.

[61262] VGR4427 precursor RNA folds spatially, forming VGR4427 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4427 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4427 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61263] VGR4427 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM3332 precursor RNA, VGAM3366 precursor RNA, VGAM3367 precursor RNA, VGAM3469 precursor RNA, VGAM3559 precursor RNA, VGAM3602 precursor RNA, VGAM3603 precursor RNA and VGAM3626 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRE-

CURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61264] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3332 RNA, VGAM3366 RNA, VGAM3367 RNA, VGAM3469 RNA, VGAM3559 RNA, VGAM3602 RNA, VGAM3603 RNA and VGAM3626 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61265] VGAM3332 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3332 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3332 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3332 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61266] VGAM3366 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3366 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3366 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3366 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61267] VGAM3367 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3367 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3367 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM3367 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61268] VGAM3469 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3469 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3469 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3469 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61269] VGAM3559 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3559 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3559 host target RNA, herein

schematically represented by VGAM5 HOST TARGET RNA into VGAM3559 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61270] VGAM3602 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3602 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3602 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3602 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61271] VGAM3603 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3603 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3603 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3603 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61272] VGAM3626 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3626 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3626 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3626 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61273] It is appreciated that a function of VGR4427 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4427 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4427

gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4427 gene: VGAM3332 host target protein, VGAM3366 host target protein, VGAM3367 host target protein, VGAM3469 host target protein, VGAM3559 host target protein, VGAM3602 host target protein, VGAM3603 host target protein and VGAM3626 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3332, VGAM3366, VGAM3367, VGAM3469, VGAM3559, VGAM3602, VGAM3603 and VGAM3626

[61274] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4428(VGR4428) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61275] VGR4428 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4428 gene was detected is described hereinabove with reference to Figs. 6–15.

[61276] VGR4428 gene encodes VGR4428 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61277] VGR4428 precursor RNA folds spatially, forming VGR4428 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4428 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4428 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61278] VGR4428 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM3656 precursor RNA, VGAM3738 pre–

cursor RNA and VGAM3775 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61279] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3656 RNA, VGAM3738 RNA and VGAM3775 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61280] VGAM3656 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3656 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3656 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3656 host target protein, herein schematically

represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61281] VGAM3738 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3738 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3738 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3738 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61282] VGAM3775 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3775 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3775 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA

into VGAM3775 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61283] It is appreciated that a function of VGR4428 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4428 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4428 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4428 gene: VGAM3656 host target protein, VGAM3738 host target protein and VGAM3775 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3656, VGAM3738 and VGAM3775

[61284] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4429(VGR4429) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61285] VGR4429 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4429 gene was detected is described hereinabove with reference to Figs. 6–15.

[61286] VGR4429 gene encodes VGR4429 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61287] VGR4429 precursor RNA folds spatially, forming VGR4429 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4429 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4429 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61288] VGR4429 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM2184 precursor RNA, VGAM2185 precursor RNA, VGAM2526 precursor RNA, VGAM2527 precursor RNA, VGAM2948 precursor RNA, VGAM2997 precursor RNA and VGAM3156 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61289] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2184 RNA, VGAM2185 RNA, VGAM2526 RNA, VGAM2527 RNA, VGAM2948 RNA, VGAM2997 RNA and VGAM3156 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61290] VGAM2184 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2184 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2184 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2184 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61291] VGAM2185 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2185 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2185 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2185 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61292] VGAM2526 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2526 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2526 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2526 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61293] VGAM2527 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2527 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2527 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2527 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[61294] VGAM2948 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2948 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2948 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2948 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61295] VGAM2997 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2997 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2997 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2997 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61296] VGAM3156 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3156 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3156 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3156 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61297] It is appreciated that a function of VGR4429 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4429 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4429 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4429 gene: VGAM2184 host target protein, VGAM2185 host target protein, VGAM2526 host target protein, VGAM2527 host target protein, VGAM2948 host target protein, VGAM2997 host target protein and VGAM3156 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2184, VGAM2185, VGAM2526, VGAM2527, VGAM2948, VGAM2997 and VGAM3156

[61298] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4430(VGR4430) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61299] VGR4430 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4430 gene was detected is described hereinabove with reference to Figs.

6-15.

[61300] VGR4430 gene encodes VGR4430 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61301] VGR4430 precursor RNA folds spatially, forming VGR4430 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4430 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4430 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61302] VGR4430 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM577 precursor RNA, VGAM578 precursor RNA, VGAM579 precursor RNA, VGAM580 precursor RNA, VGAM926 precursor RNA, VGAM2123 precursor RNA, VGAM2124 precursor RNA and VGAM2125 precursor RNA, herein schematically represented by VGAM1 PRE-

CURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61303] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM577 RNA, VGAM578 RNA, VGAM579 RNA, VGAM580 RNA, VGAM926 RNA, VGAM2123 RNA, VGAM2124 RNA and VGAM2125 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61304] VGAM577 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM577 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM577 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM577 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61305] VGAM578 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM578 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM578 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM578 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61306] VGAM579 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM579 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM579 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM579 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61307] VGAM580 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM580 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM580 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM580 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61308] VGAM926 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM926 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM926 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM926 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61309] VGAM2123 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2123 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2123 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2123 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61310] VGAM2124 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2124 host target RNA, herein schematically represented by VGAM7

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2124 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2124 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61311] VGAM2125 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2125 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2125 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2125 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61312] It is appreciated that a function of VGR4430 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attack–

ing a host. Accordingly, utilities of VGR4430 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4430 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4430 gene: VGAM577 host target protein, VGAM578 host target protein, VGAM579 host target protein, VGAM580 host target protein, VGAM926 host target protein, VGAM2123 host target protein, VGAM2124 host target protein and VGAM2125 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM577, VGAM578, VGAM579, VGAM580, VGAM926, VGAM2123, VGAM2124 and VGAM2125

[61313] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4431(VGR4431) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[61314] VGR4431 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4431 gene was detected is described hereinabove with reference to Figs. 6–15.

[61315] VGR4431 gene encodes VGR4431 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61316] VGR4431 precursor RNA folds spatially, forming VGR4431 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4431 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4431 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61317] VGR4431 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2126 precursor RNA, VGAM2127 precursor RNA, VGAM2513 precursor RNA and VGAM2991 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61318] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2126 RNA, VGAM2127 RNA, VGAM2513 RNA and VGAM2991 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61319] VGAM2126 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2126 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2126 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2126 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61320] VGAM2127 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2127 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2127 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2127 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61321] VGAM2513 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2513 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2513 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2513 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61322] VGAM2991 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2991 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2991 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2991 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61323] It is appreciated that a function of VGR4431 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4431 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4431 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4431 gene: VGAM2126 host target protein, VGAM2127 host target protein, VGAM2513 host target protein and VGAM2991 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2126, VGAM2127, VGAM2513 and VGAM2991

[61324] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4432(VGR4432) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61325] VGR4432 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4432 gene was detected is described hereinabove with reference to Figs. 6–15.

[61326] VGR4432 gene encodes VGR4432 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61327] VGR4432 precursor RNA folds spatially, forming VGR4432 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4432 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4432 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61328] VGR4432 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM899 precursor RNA and VGAM901 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of

which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61329] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM899 RNA and VGAM901 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61330] VGAM899 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM899 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM899 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM899 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61331] VGAM901 RNA, herein schematically represented by

VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM901 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM901 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM901 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61332] It is appreciated that a function of VGR4432 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4432 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4432 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4432 gene: VGAM899 host target protein and VGAM901 host target protein, herein schematically represented by VGAM1 HOST TARGET PRO-

TEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated herein—above with reference to VGAM899 and VGAM901

[61333] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4433(VGR4433) viral gene, which encodes an operon—like cluster of novel viral micro RNA—like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61334] VGR4433 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4433 gene was detected is described hereinabove with reference to Figs. 6–15.

[61335] VGR4433 gene encodes VGR4433 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61336] VGR4433 precursor RNA folds spatially, forming VGR4433 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4433 folded precursor RNA, herein designated VGR FOLDED PRECUR—

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4433 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61337] VGR4433 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2345 precursor RNA, VGAM2346 precursor RNA and VGAM2347 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61338] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2345 RNA, VGAM2346 RNA and VGAM2347 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM

RNAs corresponding to VGAM RNA of Fig. 8.

[61339] VGAM2345 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2345 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2345 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2345 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61340] VGAM2346 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2346 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2346 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2346 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61341] VGAM2347 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2347 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2347 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2347 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61342] It is appreciated that a function of VGR4433 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4433 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4433 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in

the operon-like cluster of VGR4433 gene: VGAM2345 host target protein, VGAM2346 host target protein and VGAM2347 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2345, VGAM2346 and VGAM2347

[61343] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4434(VGR4434) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61344] VGR4434 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4434 gene was detected is described hereinabove with reference to Figs. 6-15.

[61345] VGR4434 gene encodes VGR4434 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61346] VGR4434 precursor RNA folds spatially, forming VGR4434 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4434 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4434 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61347] VGR4434 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM272 precursor RNA, VGAM273 precursor RNA, VGAM281 precursor RNA, VGAM284 precursor RNA, VGAM287 precursor RNA, VGAM289 precursor RNA, VGAM290 precursor RNA and VGAM293 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61348] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM272 RNA, VGAM273 RNA, VGAM281 RNA, VGAM284 RNA, VGAM287 RNA, VGAM289 RNA, VGAM290 RNA and VGAM293 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61349] VGAM272 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM272 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM272 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM272 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of

Fig. 1.

[61350] VGAM273 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM273 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM273 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM273 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61351] VGAM281 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM281 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM281 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM281 host target protein, herein schematically

represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61352] VGAM284 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM284 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM284 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM284 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61353] VGAM287 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM287 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM287 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA

into VGAM287 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61354] VGAM289 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM289 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM289 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM289 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61355] VGAM290 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM290 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM290 host target RNA, herein

schematically represented by VGAM7 HOST TARGET RNA into VGAM290 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61356] VGAM293 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM293 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM293 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM293 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61357] It is appreciated that a function of VGR4434 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4434 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4434 gene, herein designated VGR GENE, correlate with, and

may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4434 gene: VGAM272 host target protein, VGAM273 host target protein, VGAM281 host target protein, VGAM284 host target protein, VGAM287 host target protein, VGAM289 host target protein, VGAM290 host target protein and VGAM293 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM272, VGAM273, VGAM281, VGAM284, VGAM287, VGAM289, VGAM290 and VGAM293

[61358] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4435(VGR4435) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61359] VGR4435 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4435 gene was detected is described hereinabove with reference to Figs. 6–15.

[61360] VGR4435 gene encodes VGR4435 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61361] VGR4435 precursor RNA folds spatially, forming VGR4435 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4435 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4435 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61362] VGR4435 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM295 precursor RNA, VGAM298 precursor RNA, VGAM300 precursor RNA, VGAM307 precursor RNA, VGAM310 precursor RNA, VGAM312 precursor RNA,

VGAM851 precursor RNA and VGAM1256 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61363] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM295 RNA, VGAM298 RNA, VGAM300 RNA, VGAM307 RNA, VGAM310 RNA, VGAM312 RNA, VGAM851 RNA and VGAM1256 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61364] VGAM295 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM295 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM295 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM295 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61365] VGAM298 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM298 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM298 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM298 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61366] VGAM300 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM300 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM300 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM300 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61367] VGAM307 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM307 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM307 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM307 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61368] VGAM310 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM310 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM310 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM310 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61369] VGAM312 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM312 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM312 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM312 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61370] VGAM851 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM851 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM851 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM851 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61371] VGAM1256 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1256 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1256 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1256 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61372] It is appreciated that a function of VGR4435 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4435 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4435 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4435 gene: VGAM295 host target protein, VGAM298 host target protein, VGAM300 host target protein, VGAM307 host target protein, VGAM310 host target protein, VGAM312 host target protein, VGAM851 host target protein and VGAM1256 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM295, VGAM298, VGAM300, VGAM307, VGAM310, VGAM312, VGAM851 and VGAM1256

[61373] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4436(VGR4436) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61374] VGR4436 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4436 gene was detected is described hereinabove with reference to Figs. 6–15.

[61375] VGR4436 gene encodes VGR4436 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61376] VGR4436 precursor RNA folds spatially, forming VGR4436 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4436 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4436 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61377] VGR4436 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1314 precursor RNA, VGAM1316 precursor RNA, VGAM1567 precursor RNA, VGAM1663 precursor RNA, VGAM1666 precursor RNA, VGAM1866 precursor RNA, VGAM1867 precursor RNA and VGAM2144 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61378] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1314 RNA, VGAM1316 RNA, VGAM1567 RNA, VGAM1663 RNA, VGAM1666 RNA, VGAM1866 RNA, VGAM1867 RNA and VGAM2144 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs correspond-

ing to VGAM RNA of Fig. 8.

[61379] VGAM1314 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1314 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1314 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1314 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61380] VGAM1316 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1316 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1316 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1316 host target protein, herein schematically

represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61381] VGAM1567 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1567 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1567 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1567 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61382] VGAM1663 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1663 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1663 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA

into VGAM1663 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61383] VGAM1666 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1666 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1666 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1666 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61384] VGAM1866 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1866 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1866 host target RNA, herein

schematically represented by VGAM6 HOST TARGET RNA into VGAM1866 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61385] VGAM1867 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1867 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1867 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1867 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61386] VGAM2144 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2144 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2144 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2144 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61387] It is appreciated that a function of VGR4436 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4436 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4436 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4436 gene: VGAM1314 host target protein, VGAM1316 host target protein, VGAM1567 host target protein, VGAM1663 host target protein, VGAM1666 host target protein, VGAM1866 host target protein, VGAM1867 host target protein and VGAM2144 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with

reference to VGAM1314, VGAM1316, VGAM1567, VGAM1663, VGAM1666, VGAM1866, VGAM1867 and VGAM2144

[61388] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4437(VGR4437) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61389] VGR4437 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4437 gene was detected is described hereinabove with reference to Figs. 6–15.

[61390] VGR4437 gene encodes VGR4437 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61391] VGR4437 precursor RNA folds spatially, forming VGR4437 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4437 folded precursor RNA, herein designated VGR FOLDED PRECUR-

SOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4437 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61392] VGR4437 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2145 precursor RNA, VGAM2225 precursor RNA, VGAM2226 precursor RNA, VGAM2242 precursor RNA, VGAM2244 precursor RNA, VGAM2245 precursor RNA, VGAM2263 precursor RNA and VGAM2264 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61393] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM2145 RNA, VGAM2225 RNA, VGAM2226 RNA, VGAM2242 RNA, VGAM2244 RNA, VGAM2245 RNA, VGAM2263 RNA and VGAM2264 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61394] VGAM2145 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2145 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2145 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2145 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61395] VGAM2225 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2225 host

target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2225 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2225 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61396] VGAM2226 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2226 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2226 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2226 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61397] VGAM2242 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding

site located in an untranslated region of VGAM2242 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2242 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2242 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61398] VGAM2244 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2244 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2244 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2244 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61399] VGAM2245 RNA, herein schematically represented by

VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2245 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2245 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2245 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61400] VGAM2263 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2263 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2263 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2263 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61401] VGAM2264 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2264 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2264 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2264 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61402] It is appreciated that a function of VGR4437 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4437 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4437 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4437 gene: VGAM2145 host target protein, VGAM2225 host target protein,

VGAM2226 host target protein, VGAM2242 host target protein, VGAM2244 host target protein, VGAM2245 host target protein, VGAM2263 host target protein and VGAM2264 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2145, VGAM2225, VGAM2226, VGAM2242, VGAM2244, VGAM2245, VGAM2263 and VGAM2264

[61403] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4438(VGR4438) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61404] VGR4438 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4438 gene was detected is described hereinabove with reference to Figs. 6–15.

[61405] VGR4438 gene encodes VGR4438 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61406] VGR4438 precursor RNA folds spatially, forming VGR4438 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4438 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4438 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61407] VGR4438 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2265 precursor RNA, VGAM2395 precursor RNA, VGAM2498 precursor RNA, VGAM2512 precursor RNA, VGAM2538 precursor RNA, VGAM2539 precursor RNA, VGAM2562 precursor RNA and VGAM2563 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRE-

CURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61408] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2265 RNA, VGAM2395 RNA, VGAM2498 RNA, VGAM2512 RNA, VGAM2538 RNA, VGAM2539 RNA, VGAM2562 RNA and VGAM2563 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61409] VGAM2265 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2265 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2265 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2265 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61410] VGAM2395 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2395 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2395 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2395 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61411] VGAM2498 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2498 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2498 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2498 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61412] VGAM2512 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2512 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2512 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2512 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61413] VGAM2538 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2538 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2538 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2538 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61414] VGAM2539 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2539 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2539 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2539 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61415] VGAM2562 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2562 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2562 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2562 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61416] VGAM2563 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2563 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2563 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2563 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61417] It is appreciated that a function of VGR4438 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4438 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4438 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4438 gene: VGAM2265 host target protein, VGAM2395 host target protein, VGAM2498 host target protein, VGAM2512 host target protein, VGAM2538 host target protein, VGAM2539 host target protein, VGAM2562 host target protein and VGAM2563 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2265, VGAM2395, VGAM2498, VGAM2512, VGAM2538, VGAM2539, VGAM2562 and VGAM2563

[61418] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4439(VGR4439) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[61419] VGR4439 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4439 gene was detected is described hereinabove with reference to Figs. 6–15.

[61420] VGR4439 gene encodes VGR4439 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61421] VGR4439 precursor RNA folds spatially, forming VGR4439 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4439 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4439 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61422] VGR4439 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2730 precursor RNA, VGAM2760 precursor RNA, VGAM2853 precursor RNA, VGAM3062 precursor RNA, VGAM3105 precursor RNA, VGAM3140 precursor RNA, VGAM3194 precursor RNA and VGAM3241 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61423] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2730 RNA, VGAM2760 RNA, VGAM2853 RNA, VGAM3062 RNA, VGAM3105 RNA, VGAM3140 RNA, VGAM3194 RNA and VGAM3241 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61424] VGAM2730 RNA, herein schematically represented by

VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2730 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2730 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2730 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61425] VGAM2760 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2760 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2760 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2760 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61426] VGAM2853 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2853 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2853 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2853 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61427] VGAM3062 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3062 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3062 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3062 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of

Fig. 1.

[61428] VGAM3105 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3105 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3105 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3105 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61429] VGAM3140 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3140 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3140 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3140 host target protein, herein schematically

represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61430] VGAM3194 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3194 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3194 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3194 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61431] VGAM3241 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3241 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3241 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA

into VGAM3241 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61432] It is appreciated that a function of VGR4439 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4439 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4439 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4439 gene: VGAM2730 host target protein, VGAM2760 host target protein, VGAM2853 host target protein, VGAM3062 host target protein, VGAM3105 host target protein, VGAM3140 host target protein, VGAM3194 host target protein and VGAM3241 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2730, VGAM2760, VGAM2853, VGAM3062, VGAM3105, VGAM3140, VGAM3194 and

VGAM3241

[61433] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4440(VGR4440) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61434] VGR4440 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4440 gene was detected is described hereinabove with reference to Figs. 6–15.

[61435] VGR4440 gene encodes VGR4440 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61436] VGR4440 precursor RNA folds spatially, forming VGR4440 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4440 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to

the fact that the nucleotide sequence of VGR4440 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61437] VGR4440 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM3244 precursor RNA, VGAM3362 precursor RNA, VGAM3432 precursor RNA, VGAM3544 precursor RNA, VGAM3611 precursor RNA, VGAM3735 precursor RNA and VGAM3824 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61438] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3244 RNA, VGAM3362 RNA, VGAM3432 RNA, VGAM3544 RNA, VGAM3611 RNA, VGAM3735 RNA and VGAM3824 RNA re-

spectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61439] VGAM3244 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3244 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3244 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3244 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61440] VGAM3362 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3362 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3362 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3362 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61441] VGAM3432 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3432 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3432 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3432 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61442] VGAM3544 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3544 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3544 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3544 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61443] VGAM3611 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3611 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3611 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3611 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61444] VGAM3735 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3735 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3735 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3735 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61445] VGAM3824 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3824 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3824 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3824 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61446] It is appreciated that a function of VGR4440 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4440 gene include

diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4440 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4440 gene: VGAM3244 host target protein, VGAM3362 host target protein, VGAM3432 host target protein, VGAM3544 host target protein, VGAM3611 host target protein, VGAM3735 host target protein and VGAM3824 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3244, VGAM3362, VGAM3432, VGAM3544, VGAM3611, VGAM3735 and VGAM3824

[61447] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4441(VGR4441) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known

in the art.

[61448] VGR4441 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4441 gene was detected is described hereinabove with reference to Figs. 6–15.

[61449] VGR4441 gene encodes VGR4441 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61450] VGR4441 precursor RNA folds spatially, forming VGR4441 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4441 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4441 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61451] VGR4441 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM pre–

cursor RNAs, VGAM291 precursor RNA, VGAM609 precursor RNA, VGAM837 precursor RNA, VGAM1009 precursor RNA, VGAM1011 precursor RNA, VGAM1099 precursor RNA, VGAM1267 precursor RNA and VGAM1817 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61452] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM291 RNA, VGAM609 RNA, VGAM837 RNA, VGAM1009 RNA, VGAM1011 RNA, VGAM1099 RNA, VGAM1267 RNA and VGAM1817 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61453] VGAM291 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding

site located in an untranslated region of VGAM291 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM291 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM291 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61454] VGAM609 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM609 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM609 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM609 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61455] VGAM837 RNA, herein schematically represented by

VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM837 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM837 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM837 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61456] VGAM1009 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1009 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1009 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1009 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61457] VGAM1011 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1011 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1011 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1011 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61458] VGAM1099 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1099 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1099 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1099 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of

Fig. 1.

[61459] VGAM1267 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1267 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1267 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1267 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61460] VGAM1817 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1817 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1817 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1817 host target protein, herein schematically

represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61461] It is appreciated that a function of VGR4441 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4441 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4441 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4441 gene: VGAM291 host target protein, VGAM609 host target protein, VGAM837 host target protein, VGAM1009 host target protein, VGAM1011 host target protein, VGAM1099 host target protein, VGAM1267 host target protein and VGAM1817 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM291, VGAM609, VGAM837, VGAM1009, VGAM1011, VGAM1099, VGAM1267 and VGAM1817

[61462] Fig. 9 further provides a conceptual description of novel

bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4442(VGR4442) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61463] VGR4442 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4442 gene was detected is described hereinabove with reference to Figs. 6–15.

[61464] VGR4442 gene encodes VGR4442 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61465] VGR4442 precursor RNA folds spatially, forming VGR4442 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4442 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4442 precursor RNA comprises a plurality of segments, the first half

of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61466] VGR4442 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1819 precursor RNA, VGAM1820 precursor RNA, VGAM1821 precursor RNA, VGAM1950 precursor RNA, VGAM1980 precursor RNA, VGAM2032 precursor RNA, VGAM2140 precursor RNA and VGAM2141 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61467] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1819 RNA, VGAM1820 RNA, VGAM1821 RNA, VGAM1950 RNA, VGAM1980 RNA, VGAM2032 RNA, VGAM2140 RNA and VGAM2141 RNA respectively, herein schematically repre-

sented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61468] VGAM1819 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1819 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1819 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1819 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61469] VGAM1820 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1820 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1820 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1820 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61470] VGAM1821 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1821 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1821 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1821 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61471] VGAM1950 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1950 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1950 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1950 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61472] VGAM1980 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1980 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1980 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1980 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61473] VGAM2032 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2032 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2032 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2032 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61474] VGAM2140 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2140 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2140 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2140 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61475] VGAM2141 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2141 host target RNA, herein schematically represented by VGAM8

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2141 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2141 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61476] It is appreciated that a function of VGR4442 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4442 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4442 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4442 gene: VGAM1819 host target protein, VGAM1820 host target protein, VGAM1821 host target protein, VGAM1950 host target protein, VGAM1980 host target protein, VGAM2032 host target protein, VGAM2140 host target protein and VGAM2141 host target protein, herein schematically rep-

resented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1819, VGAM1820, VGAM1821, VGAM1950, VGAM1980, VGAM2032, VGAM2140 and VGAM2141

[61477] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4443(VGR4443) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61478] VGR4443 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4443 gene was detected is described hereinabove with reference to Figs. 6–15.

[61479] VGR4443 gene encodes VGR4443 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61480] VGR4443 precursor RNA folds spatially, forming VGR4443

folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4443 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4443 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61481] VGR4443 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2143 precursor RNA, VGAM2183 precursor RNA, VGAM2217 precursor RNA, VGAM2261 precursor RNA, VGAM2262 precursor RNA, VGAM2266 precursor RNA, VGAM2268 precursor RNA and VGAM2269 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to

VGAM PRECURSOR RNA of Fig. 8.

[61482] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2143 RNA, VGAM2183 RNA, VGAM2217 RNA, VGAM2261 RNA, VGAM2262 RNA, VGAM2266 RNA, VGAM2268 RNA and VGAM2269 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61483] VGAM2143 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2143 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2143 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2143 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61484] VGAM2183 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2183 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2183 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2183 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61485] VGAM2217 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2217 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2217 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2217 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[61486] VGAM2261 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2261 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2261 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2261 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61487] VGAM2262 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2262 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2262 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2262 host target protein, herein schematically

represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61488] VGAM2266 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2266 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2266 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2266 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61489] VGAM2268 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2268 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2268 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA

into VGAM2268 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61490] VGAM2269 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2269 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2269 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2269 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61491] It is appreciated that a function of VGR4443 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4443 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4443 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4443 gene: VGAM2143 host target protein, VGAM2183 host target protein, VGAM2217 host target protein, VGAM2261 host target protein, VGAM2262 host target protein, VGAM2266 host target protein, VGAM2268 host target protein and VGAM2269 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2143, VGAM2183, VGAM2217, VGAM2261, VGAM2262, VGAM2266, VGAM2268 and VGAM2269

[61492] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4444(VGR4444) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61493] VGR4444 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4444 gene was detected is described hereinabove with reference to Figs. 6–15.

[61494] VGR4444 gene encodes VGR4444 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61495] VGR4444 precursor RNA folds spatially, forming VGR4444 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4444 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4444 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61496] VGR4444 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2342 precursor RNA, VGAM2344 precursor RNA, VGAM2568 precursor RNA, VGAM2569 precursor RNA, VGAM2583 precursor RNA, VGAM2638 pre–

cursor RNA, VGAM2806 precursor RNA and VGAM2857 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61497] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2342 RNA, VGAM2344 RNA, VGAM2568 RNA, VGAM2569 RNA, VGAM2583 RNA, VGAM2638 RNA, VGAM2806 RNA and VGAM2857 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61498] VGAM2342 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2342 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2342 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2342 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61499] VGAM2344 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2344 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2344 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2344 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61500] VGAM2568 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2568 host target RNA, herein schematically represented by VGAM3

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2568 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2568 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61501] VGAM2569 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2569 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2569 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2569 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61502] VGAM2583 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2583 host

target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2583 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2583 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61503] VGAM2638 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2638 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2638 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2638 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61504] VGAM2806 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding

site located in an untranslated region of VGAM2806 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2806 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2806 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61505] VGAM2857 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2857 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2857 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2857 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61506] It is appreciated that a function of VGR4444 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4444 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4444 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4444 gene: VGAM2342 host target protein, VGAM2344 host target protein, VGAM2568 host target protein, VGAM2569 host target protein, VGAM2583 host target protein, VGAM2638 host target protein, VGAM2806 host target protein and VGAM2857 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2342, VGAM2344, VGAM2568, VGAM2569, VGAM2583, VGAM2638, VGAM2806 and VGAM2857

[61507] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4445(VGR4445) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61508] VGR4445 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4445 gene was detected is described hereinabove with reference to Figs. 6–15.

[61509] VGR4445 gene encodes VGR4445 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61510] VGR4445 precursor RNA folds spatially, forming VGR4445 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4445 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4445 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[61511] VGR4445 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM2858 precursor RNA, VGAM2885 precursor RNA, VGAM2911 precursor RNA, VGAM2928 precursor RNA, VGAM2975 precursor RNA, VGAM3015 precursor RNA, VGAM3016 precursor RNA and VGAM3017 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61512] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2858 RNA, VGAM2885 RNA, VGAM2911 RNA, VGAM2928 RNA, VGAM2975 RNA, VGAM3015 RNA, VGAM3016 RNA and VGAM3017 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8

RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61513] VGAM2858 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2858 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2858 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2858 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61514] VGAM2885 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2885 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2885 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA

into VGAM2885 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61515] VGAM2911 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2911 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2911 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2911 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61516] VGAM2928 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2928 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2928 host target RNA, herein

schematically represented by VGAM4 HOST TARGET RNA into VGAM2928 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61517] VGAM2975 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2975 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2975 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2975 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61518] VGAM3015 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM3015 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3015 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3015 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61519] VGAM3016 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3016 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3016 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3016 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61520] VGAM3017 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM3017 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3017 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM3017 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61521] It is appreciated that a function of VGR4445 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4445 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4445 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4445 gene: VGAM2858 host target protein, VGAM2885 host target protein, VGAM2911 host target protein, VGAM2928 host target protein, VGAM2975 host target protein, VGAM3015 host target protein, VGAM3016 host target protein and VGAM3017 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function

of these host target genes is elaborated hereinabove with reference to VGAM2858, VGAM2885, VGAM2911, VGAM2928, VGAM2975, VGAM3015, VGAM3016 and VGAM3017

[61522] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4446(VGR4446) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61523] VGR4446 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4446 gene was detected is described hereinabove with reference to Figs. 6–15.

[61524] VGR4446 gene encodes VGR4446 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61525] VGR4446 precursor RNA folds spatially, forming VGR4446 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4446 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4446 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61526] VGR4446 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM3110 precursor RNA, VGAM3169 precursor RNA, VGAM3176 precursor RNA, VGAM3352 precursor RNA, VGAM3579 precursor RNA, VGAM3610 precursor RNA and VGAM3686 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61527] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA

segments of about 22 nucleotides in length, VGAM3110 RNA, VGAM3169 RNA, VGAM3176 RNA, VGAM3352 RNA, VGAM3579 RNA, VGAM3610 RNA and VGAM3686 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61528] VGAM3110 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3110 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3110 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3110 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61529] VGAM3169 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3169 host target RNA, herein schematically represented by VGAM2

HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3169 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3169 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61530] VGAM3176 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3176 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3176 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3176 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61531] VGAM3352 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3352 host

target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3352 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3352 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61532] VGAM3579 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM3579 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3579 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM3579 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61533] VGAM3610 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding

site located in an untranslated region of VGAM3610 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3610 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM3610 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61534] VGAM3686 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM3686 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3686 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM3686 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61535] It is appreciated that a function of VGR4446 gene, herein

designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4446 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4446 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4446 gene: VGAM3110 host target protein, VGAM3169 host target protein, VGAM3176 host target protein, VGAM3352 host target protein, VGAM3579 host target protein, VGAM3610 host target protein and VGAM3686 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3110, VGAM3169, VGAM3176, VGAM3352, VGAM3579, VGAM3610 and VGAM3686

[61536] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4447(VGR4447) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61537] VGR4447 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4447 gene was detected is described hereinabove with reference to Figs. 6–15.

[61538] VGR4447 gene encodes VGR4447 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61539] VGR4447 precursor RNA folds spatially, forming VGR4447 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4447 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4447 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61540] VGR4447 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1380 precursor RNA, VGAM1383 precursor RNA and VGAM1384 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61541] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1380 RNA, VGAM1383 RNA and VGAM1384 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61542] VGAM1380 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1380 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1380 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1380 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61543] VGAM1383 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1383 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1383 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1383 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61544] VGAM1384 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1384 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1384 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1384 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61545] It is appreciated that a function of VGR4447 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4447 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4447 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4447 gene: VGAM1380 host target protein, VGAM1383 host target protein and VGAM1384 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1380, VGAM1383 and VGAM1384

[61546] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4448(VGR4448) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61547] VGR4448 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4448 gene was detected is described hereinabove with reference to Figs. 6-15.

[61548] VGR4448 gene encodes VGR4448 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61549] VGR4448 precursor RNA folds spatially, forming VGR4448 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4448 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4448 precu-

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61550] VGR4448 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM1597 precursor RNA, VGAM1601 precursor RNA, VGAM2817 precursor RNA and VGAM2818 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61551] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1597 RNA, VGAM1601 RNA, VGAM2817 RNA and VGAM2818 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61552] VGAM1597 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1597 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1597 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1597 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61553] VGAM1601 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1601 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1601 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1601 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[61554] VGAM2817 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2817 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2817 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2817 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61555] VGAM2818 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2818 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2818 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2818 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61556] It is appreciated that a function of VGR4448 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4448 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4448 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4448 gene: VGAM1597 host target protein, VGAM1601 host target protein, VGAM2817 host target protein and VGAM2818 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1597, VGAM1601, VGAM2817 and VGAM2818

[61557] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4449(VGR4449) viral gene, which encodes an operon-like cluster of novel viral

micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61558] VGR4449 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4449 gene was detected is described hereinabove with reference to Figs. 6–15.

[61559] VGR4449 gene encodes VGR4449 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61560] VGR4449 precursor RNA folds spatially, forming VGR4449 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4449 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4449 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61561] VGR4449 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2451 precursor RNA, VGAM2452 precursor RNA and VGAM3813 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61562] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2451 RNA, VGAM2452 RNA and VGAM3813 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61563] VGAM2451 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2451 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2451 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2451 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61564] VGAM2452 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2452 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2452 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2452 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61565] VGAM3813 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM3813 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3813 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM3813 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61566] It is appreciated that a function of VGR4449 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4449 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4449 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4449 gene: VGAM2451 host target protein, VGAM2452 host target protein and VGAM3813 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2451, VGAM2452 and VGAM3813

[61567] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4450(VGR4450) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61568] VGR4450 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4450 gene was detected is described hereinabove with reference to Figs. 6–15.

[61569] VGR4450 gene encodes VGR4450 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61570] VGR4450 precursor RNA folds spatially, forming VGR4450 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4450 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4450 precursor

sor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61571] VGR4450 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3708 precursor RNA and VGAM3746 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61572] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3708 RNA and VGAM3746 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61573] VGAM3708 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3708 host

target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3708 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3708 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61574] VGAM3746 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3746 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3746 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3746 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61575] It is appreciated that a function of VGR4450 gene, herein designated VGR GENE, is inhibition of expression of host

target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4450 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4450 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4450 gene: VGAM3708 host target protein and VGAM3746 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3708 and VGAM3746

[61576] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4451(VGR4451) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61577] VGR4451 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding,

RNA viral gene. The method by which VGR4451 gene was detected is described hereinabove with reference to Figs. 6–15.

[61578] VGR4451 gene encodes VGR4451 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61579] VGR4451 precursor RNA folds spatially, forming VGR4451 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4451 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4451 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61580] VGR4451 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM1808 precursor RNA, VGAM1812 precursor RNA and VGAM2294 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2

PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61581] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1808 RNA, VGAM1812 RNA and VGAM2294 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61582] VGAM1808 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1808 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1808 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1808 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61583] VGAM1812 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM1812 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1812 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM1812 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61584] VGAM2294 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2294 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2294 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2294 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[61585] It is appreciated that a function of VGR4451 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4451 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4451 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4451 gene: VGAM1808 host target protein, VGAM1812 host target protein and VGAM2294 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1808, VGAM1812 and VGAM2294

[61586] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4452(VGR4452) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function

and utility of which at least one host target gene is known in the art.

[61587] VGR4452 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4452 gene was detected is described hereinabove with reference to Figs. 6–15.

[61588] VGR4452 gene encodes VGR4452 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61589] VGR4452 precursor RNA folds spatially, forming VGR4452 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4452 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4452 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61590] VGR4452 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellu–

lar enzymatic activity into at least 3 separate VGAM precursor RNAs, VGAM2570 precursor RNA, VGAM2571 precursor RNA and VGAM2953 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR and VGAM3 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61591] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2570 RNA, VGAM2571 RNA and VGAM2953 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA and VGAM3 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61592] VGAM2570 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2570 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2570 host target RNA, herein

schematically represented by VGAM1 HOST TARGET RNA into VGAM2570 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61593] VGAM2571 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2571 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2571 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2571 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61594] VGAM2953 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2953 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM2953 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2953 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61595] It is appreciated that a function of VGR4452 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4452 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4452 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4452 gene: VGAM2570 host target protein, VGAM2571 host target protein and VGAM2953 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2570, VGAM2571 and VGAM2953

[61596] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred

to here as Viral Genomic Record 4453(VGR4453) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61597] VGR4453 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4453 gene was detected is described hereinabove with reference to Figs. 6-15.

[61598] VGR4453 gene encodes VGR4453 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61599] VGR4453 precursor RNA folds spatially, forming VGR4453 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4453 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4453 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which

is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61600] VGR4453 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM657 precursor RNA, VGAM659 precursor RNA, VGAM1110 precursor RNA, VGAM1127 precursor RNA, VGAM1128 precursor RNA, VGAM1317 precursor RNA, VGAM1319 precursor RNA and VGAM1530 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61601] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM657 RNA, VGAM659 RNA, VGAM1110 RNA, VGAM1127 RNA, VGAM1128 RNA, VGAM1317 RNA, VGAM1319 RNA and VGAM1530 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4

RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61602] VGAM657 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM657 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM657 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM657 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61603] VGAM659 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM659 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM659 host target RNA, herein

schematically represented by VGAM2 HOST TARGET RNA into VGAM659 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61604] VGAM1110 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM1110 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1110 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM1110 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61605] VGAM1127 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM1127 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM1127 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM1127 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61606] VGAM1128 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM1128 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1128 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM1128 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61607] VGAM1317 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM1317 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE

I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1317 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM1317 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61608] VGAM1319 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM1319 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1319 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM1319 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61609] VGAM1530 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM1530 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corre-

sponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1530 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM1530 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61610] It is appreciated that a function of VGR4453 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4453 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4453 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4453 gene: VGAM657 host target protein, VGAM659 host target protein, VGAM1110 host target protein, VGAM1127 host target protein, VGAM1128 host target protein, VGAM1317 host target protein, VGAM1319 host target protein and VGAM1530 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TAR-

GET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM657, VGAM659, VGAM1110, VGAM1127, VGAM1128, VGAM1317, VGAM1319 and VGAM1530

[61611] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4454(VGR4454) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61612] VGR4454 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4454 gene was detected is described hereinabove with reference to Figs. 6–15.

[61613] VGR4454 gene encodes VGR4454 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61614] VGR4454 precursor RNA folds spatially, forming VGR4454 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4454 folded

precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4454 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61615] VGR4454 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 8 separate VGAM precursor RNAs, VGAM1569 precursor RNA, VGAM2161 precursor RNA, VGAM2162 precursor RNA, VGAM2224 precursor RNA, VGAM2227 precursor RNA, VGAM2373 precursor RNA, VGAM2381 precursor RNA and VGAM2382 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR, VGAM7 PRECURSOR and VGAM8 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61616] The above mentioned VGAM precursor RNAs are diced by

DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM1569 RNA, VGAM2161 RNA, VGAM2162 RNA, VGAM2224 RNA, VGAM2227 RNA, VGAM2373 RNA, VGAM2381 RNA and VGAM2382 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA, VGAM7 RNA and VGAM8 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61617] VGAM1569 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM1569 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM1569 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM1569 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61618] VGAM2161 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM2161 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2161 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2161 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61619] VGAM2162 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2162 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2162 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2162 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61620] VGAM2224 RNA, herein schematically represented by

VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2224 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2224 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2224 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61621] VGAM2227 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2227 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2227 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2227 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61622] VGAM2373 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2373 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2373 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA into VGAM2373 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61623] VGAM2381 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2381 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2381 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2381 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of

Fig. 1.

[61624] VGAM2382 RNA, herein schematically represented by VGAM8 binds complementarily to a host target binding site located in an untranslated region of VGAM2382 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2382 host target RNA, herein schematically represented by VGAM8 HOST TARGET RNA into VGAM2382 host target protein, herein schematically represented by VGAM8 HOST TARGET PROTEIN, both of Fig. 1.

[61625] It is appreciated that a function of VGR4454 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4454 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4454 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4454 gene: VGAM1569

host target protein, VGAM2161 host target protein, VGAM2162 host target protein, VGAM2224 host target protein, VGAM2227 host target protein, VGAM2373 host target protein, VGAM2381 host target protein and VGAM2382 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM1569, VGAM2161, VGAM2162, VGAM2224, VGAM2227, VGAM2373, VGAM2381 and VGAM2382

[61626] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4455(VGR4455) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61627] VGR4455 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4455 gene was detected is described hereinabove with reference to Figs.

6-15.

[61628] VGR4455 gene encodes VGR4455 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61629] VGR4455 precursor RNA folds spatially, forming VGR4455 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4455 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4455 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61630] VGR4455 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 4 separate VGAM precursor RNAs, VGAM2770 precursor RNA, VGAM2841 precursor RNA, VGAM2899 precursor RNA and VGAM3344 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR and VGAM4 PRECURSOR respectively, each of

which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61631] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM2770 RNA, VGAM2841 RNA, VGAM2899 RNA and VGAM3344 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA and VGAM4 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61632] VGAM2770 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM2770 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2770 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM2770 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61633] VGAM2841 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2841 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2841 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2841 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61634] VGAM2899 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2899 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2899 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2899 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of

Fig. 1.

[61635] VGAM3344 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM3344 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3344 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM3344 host target protein, herein schematically represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61636] It is appreciated that a function of VGR4455 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4455 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4455 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4455 gene: VGAM2770

host target protein, VGAM2841 host target protein, VGAM2899 host target protein and VGAM3344 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM2770, VGAM2841, VGAM2899 and VGAM3344

[61637] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4456(VGR4456) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61638] VGR4456 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4456 gene was detected is described hereinabove with reference to Figs. 6-15.

[61639] VGR4456 gene encodes VGR4456 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61640] VGR4456 precursor RNA folds spatially, forming VGR4456 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4456 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4456 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the second half thereof, as is well known in the art.

[61641] VGR4456 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3505 precursor RNA and VGAM3506 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61642] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3505

RNA and VGAM3506 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61643] VGAM3505 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3505 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3505 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3505 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61644] VGAM3506 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM3506 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby in-

hibiting translation of VGAM3506 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3506 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

- [61645] It is appreciated that a function of VGR4456 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4456 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4456 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4456 gene: VGAM3505 host target protein and VGAM3506 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM3505 and VGAM3506
- [61646] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4457(VGR4457) viral

gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61647] VGR4457 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4457 gene was detected is described hereinabove with reference to Figs. 6–15.

[61648] VGR4457 gene encodes VGR4457 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61649] VGR4457 precursor RNA folds spatially, forming VGR4457 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4457 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4457 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed-reversed sequence of the

second half thereof, as is well known in the art.

[61650] VGR4457 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 7 separate VGAM precursor RNAs, VGAM471 precursor RNA, VGAM2443 precursor RNA, VGAM2444 precursor RNA, VGAM2445 precursor RNA, VGAM2682 precursor RNA, VGAM2778 precursor RNA and VGAM2779 precursor RNA, herein schematically represented by VGAM1 PRECURSOR, VGAM2 PRECURSOR, VGAM3 PRECURSOR, VGAM4 PRECURSOR, VGAM5 PRECURSOR, VGAM6 PRECURSOR and VGAM7 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61651] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM471 RNA, VGAM2443 RNA, VGAM2444 RNA, VGAM2445 RNA, VGAM2682 RNA, VGAM2778 RNA and VGAM2779 RNA respectively, herein schematically represented by VGAM1 RNA, VGAM2 RNA, VGAM3 RNA, VGAM4 RNA, VGAM5 RNA, VGAM6 RNA and VGAM7 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61652] VGAM471 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM471 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM471 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM471 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61653] VGAM2443 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding site located in an untranslated region of VGAM2443 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2443 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM2443 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of

Fig. 1.

[61654] VGAM2444 RNA, herein schematically represented by VGAM3 binds complementarily to a host target binding site located in an untranslated region of VGAM2444 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2444 host target RNA, herein schematically represented by VGAM3 HOST TARGET RNA into VGAM2444 host target protein, herein schematically represented by VGAM3 HOST TARGET PROTEIN, both of Fig. 1.

[61655] VGAM2445 RNA, herein schematically represented by VGAM4 binds complementarily to a host target binding site located in an untranslated region of VGAM2445 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2445 host target RNA, herein schematically represented by VGAM4 HOST TARGET RNA into VGAM2445 host target protein, herein schematically

represented by VGAM4 HOST TARGET PROTEIN, both of Fig. 1.

[61656] VGAM2682 RNA, herein schematically represented by VGAM5 binds complementarily to a host target binding site located in an untranslated region of VGAM2682 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2682 host target RNA, herein schematically represented by VGAM5 HOST TARGET RNA into VGAM2682 host target protein, herein schematically represented by VGAM5 HOST TARGET PROTEIN, both of Fig. 1.

[61657] VGAM2778 RNA, herein schematically represented by VGAM6 binds complementarily to a host target binding site located in an untranslated region of VGAM2778 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2778 host target RNA, herein schematically represented by VGAM6 HOST TARGET RNA

into VGAM2778 host target protein, herein schematically represented by VGAM6 HOST TARGET PROTEIN, both of Fig. 1.

[61658] VGAM2779 RNA, herein schematically represented by VGAM7 binds complementarily to a host target binding site located in an untranslated region of VGAM2779 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM2779 host target RNA, herein schematically represented by VGAM7 HOST TARGET RNA into VGAM2779 host target protein, herein schematically represented by VGAM7 HOST TARGET PROTEIN, both of Fig. 1.

[61659] It is appreciated that a function of VGR4457 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4457 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4457 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target

genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4457 gene: VGAM471 host target protein, VGAM2443 host target protein, VGAM2444 host target protein, VGAM2445 host target protein, VGAM2682 host target protein, VGAM2778 host target protein and VGAM2779 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN through VGAM HOST TARGET PROTEIN respectively. The function of these host target genes is elaborated hereinabove with reference to VGAM471, VGAM2443, VGAM2444, VGAM2445, VGAM2682, VGAM2778 and VGAM2779

[61660] Fig. 9 further provides a conceptual description of novel bioinformatically detected regulatory viral gene, referred to here as Viral Genomic Record 4458(VGR4458) viral gene, which encodes an operon-like cluster of novel viral micro RNA-like genes, each of which in turn modulates expression of at least one host target gene, the function and utility of which at least one host target gene is known in the art.

[61661] VGR4458 gene, herein designated VGR GENE, is a novel bioinformatically detected regulatory, non protein coding, RNA viral gene. The method by which VGR4458 gene was

detected is described hereinabove with reference to Figs. 6–15.

[61662] VGR4458 gene encodes VGR4458 precursor RNA, herein designated VGR PRECURSOR RNA, an RNA molecule, typically several hundred nucleotides long.

[61663] VGR4458 precursor RNA folds spatially, forming VGR4458 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA. It is appreciated that VGR4458 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, comprises a plurality of what is known in the art as hairpin structures. These hairpin structures are due to the fact that the nucleotide sequence of VGR4458 precursor RNA comprises a plurality of segments, the first half of each such segment having a nucleotide sequence which is at least a partial inversed–reversed sequence of the second half thereof, as is well known in the art.

[61664] VGR4458 folded precursor RNA, herein designated VGR FOLDED PRECURSOR RNA, is naturally processed by cellular enzymatic activity into at least 2 separate VGAM precursor RNAs, VGAM3490 precursor RNA and VGAM3729 precursor RNA, herein schematically represented by VGAM1 PRECURSOR and VGAM2 PRECURSOR respectively, each of which VGAM precursor RNAs being a hairpin

shaped RNA segment, corresponding to VGAM PRECURSOR RNA of Fig. 8.

[61665] The above mentioned VGAM precursor RNAs are diced by DICER COMPLEX of Fig. 8, yielding respective short RNA segments of about 22 nucleotides in length, VGAM3490 RNA and VGAM3729 RNA respectively, herein schematically represented by VGAM1 RNA and VGAM2 RNA respectively, each of which VGAM RNAs corresponding to VGAM RNA of Fig. 8.

[61666] VGAM3490 RNA, herein schematically represented by VGAM1 binds complementarily to a host target binding site located in an untranslated region of VGAM3490 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3490 host target RNA, herein schematically represented by VGAM1 HOST TARGET RNA into VGAM3490 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN, both of Fig. 1.

[61667] VGAM3729 RNA, herein schematically represented by VGAM2 binds complementarily to a host target binding

site located in an untranslated region of VGAM3729 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA, which host target binding site corresponds to a host target binding site such as BINDING SITE I, BINDING SITE II or BINDING SITE III of Fig. 1, thereby inhibiting translation of VGAM3729 host target RNA, herein schematically represented by VGAM2 HOST TARGET RNA into VGAM3729 host target protein, herein schematically represented by VGAM2 HOST TARGET PROTEIN, both of Fig. 1.

[61668] It is appreciated that a function of VGR4458 gene, herein designated VGR GENE, is inhibition of expression of host target genes, as part of a novel viral mechanism of attacking a host. Accordingly, utilities of VGR4458 gene include diagnosis, prevention and treatment of viral infection by . Specific functions, and accordingly utilities, of VGR4458 gene, herein designated VGR GENE, correlate with, and may be deduced from, the identity of the host target genes, which are inhibited by VGAM RNAs comprised in the operon-like cluster of VGR4458 gene: VGAM3490 host target protein and VGAM3729 host target protein, herein schematically represented by VGAM1 HOST TARGET PROTEIN and VGAM HOST TARGET PROTEIN respectively.

The function of these host target genes is elaborated hereinabove with reference to VGAM3490 and VGAM3729

[61669] **BIBLIOGRAPHY**

[61670] It is appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the present invention includes both combinations and subcombinations of the various features described hereinabove as well as variations and modifications which would occur to persons skilled in the art upon reading the specifications and which are not in the prior art.

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